DOCUMENT RESUME

ED 138 809 08 CE 011 146

AUTHOR	Copa, George H.; Kleven, Bruce A.
TITLE	Job Selection Patterns: Linkage between Vocational Education Programs and the Labor Market.
INSTITUTION	Minnesota Research Coordinating Unit for Vocational Education, Minneapolis.
PUB DATE	Feb 77
NOTE	161p.; Pages 77 and 78 (combining a followup questionnaire) were copyrighted and therefore removed. They are not included in the pagination ; Best copy available
EDRS PRICE	MF-$0.83 HC-$8.69 Plus Postage.
DESCRIPTORS	*Employment Patterns; Geographic Location; *Graduates; Graduate Surveys; Industry; Job Market; Job Placement; Labor Market; Labor Supply; *Manpower Needs; *Occupational Choice; Post Secondary Education; Prediction; *Predictive Ability (Testing); Program Planning; Research; Secondary Education; State Surveys; Technical Education; *Vocational Education; Vocational Followup
IDENTIFIERS	Minnesota

ABSTRACT

The purpose of the study was to develop and test a concept for defining the linkage between vocational education programs and the labor market. The proposed concept was titled a "job selection pattern." Procedures included collecting and analyzing occupations selected by graduates of Minnesota's area vocational technical institutes. Program areas were selected using three criteria: (1) At least one program area was selected from each of the traditional vocational education areas. (2) At least one program area was selected which was directed toward each of the basic categories of occupations of relevance to vocational education. (3) At least one program area was selected which traditionally had enrolled persons of each sex. Two major conclusions were that (1) there was a unique job selection pattern for each program area and patterns overlap between program areas, and (2) on the issue of stability of job selection patterns over time, program areas vary substantially in degree of stability and that individual program areas may have both stable and unstable aspects within their own patterns. The first section of this report describes the basis for developing the concept of a job selection pattern; the next section displays the results of trying out the concept on graduates of a selected sample of program areas. (LAS)

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Job Selection Patterns:
Linkage Between Vocational Education Programs and the Labor Market

by George H. Copa, and Bruce A. Kleven

CE 011 146

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February, 1977

ACKNOWLEDGEMENT

The authors wish to thank David Pucel, Director, Minnesota Vocational Follow-Up System at the time of this study, and Melvin Johnson, Director, Program Planning and Development Section, Division of Vocational-Technical Education, Minnesota State Department of Education, for their assistance in making available the data needed for our analyses. Special acknowledgement is given Dr. Rudolph Pinola, Director of Research and Planning, Minnesota Department of Employment Services for the original challenge to study the issues covered in the following report as a "next step" in defining the relationship between vocational programs and the labor market. The report benefited from critical review by Dr. Pucel and Robert Bocklund, Consultant, Program Planning and Development Section, Division of Vocational-Technical Education, Minnesota State Department of Education. The final form, however, is the responsibility of the authors.

George H. Copa

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ABSTRACT

The purpose of this study was to develop and test a concept for defining the linkage between vocational education programs and the labor market. Definition of this linkage is an important factor in planning vocational education programs to insure gainful employment opportunities for program leavers.

The proposed concept was entitled a "job selection pattern". The job selection pattern is a description of the jobs selected by program leavers in terms of frequency, occupation, industry, geographic location, and time. The first section of the report contains a description of the basis for developing the concept of a job selection pattern; the next section displays the results of trying out the concept on graduates of a selected sample of program areas in Minnesota's post secondary area vocational technical instututes. Concern was focused on the feasibility of developing job selection patterns for vocational education programs and the likely results of such application. Analyses were made to determine if the job selection patterns vary between different program areas and vary over time for the same program area.

Major conclusions were that job selection patterns are complex in terms of the number of occupations, industries, and geographic locations represented in the jobs selected by those leaving the programs. Further, there was a unique job selection pattern for each program area and patterns overlap between program areas. On the issue of stability of job selection patterns over time, analyses indicated that program areas vary substantially in degree of stability and that individual program areas may have both stable and unstable aspects within its own pattern.

Recommendation based on the study call for collection of follow-up data which allows development of job selection patterns for vocational education program leavers as a means of further developing and using the concept, development of job selection patterns for each program area because they appear to each be unique, beginning of an examination of "why" job selection patterns are not always stable over time, and development of better means of displaying and comparing job selection patterns.

CHAPTER I

LABOR MARKET INFORMATION AND PLANNING VOCATIONAL EDUCATION

Planning vocational education programs based on student needs and labor market demand poses several problems for the manager and teacher of vocational education. There is general agreement, at least in intention,[1] that vocational education should be planned with consideration of opportunities for gainful employment. Therefore, questions of which programs to offer, how many are needed, and where to geographically locate programs lead to parallel inquiries about which jobs are in demand, how large is demand, and where is the demand located. The use of information about labor market demand in planning vocational education requires an assumption about the interface between vocational education program titles and the job titles in which labor market demand is described.

Only if the exact pattern of jobs selected by program graduates is identified will the interface between programs and labor market demand be explicitly defined. And then, only if these patterns are stable from year to year, that is graduates from a given program select the same kinds of jobs in the same proportions each year, or if instability occurs, it can be explained, can the most meaningful planning of vocational education programs be done on the basis of labor market demand information.

PURPOSE OF STUDY

Minnesota's area vocational technical institutes presently graduate about 20,000 individuals each year from their full-time, day programs. About 90 percent of these graduates are working one year after leaving school. The percent of graduates placed in related jobs is one of the criteria used to evaluate these vocational education programs.[2] Using this criteria, projections of labor market demand becomes an important variable in planning what programs to offer, how many, and where to locate them. For example, types of jobs in demand have direct implications for the types of programs to operate; this factor becomes increasingly important as the curriculum used in a program becomes more closely tailored to preparation for specific occupations or industries. The reasoning is that presumably, the more specific the training becomes to certain occupations and industries, the less flexible are the program graduates to perform in a variety of occupations or industries. Therefore, as training becomes more specific, it is more important to be able to accurately project the type of occupations and industries in which jobs will exist when the graduates finish training if training programs are to be efficient using the criteria of placement of graduates in related jobs.

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[1] United States 90th Congress. "Amendments to the Vocational Education Act of 1963", Public Law 90-576, October 16, 1968, and new vocational education recently passed by the United States 94th Congress.

Since often a year or more expires from the time a program is first proposed until it can be initiated or from the time an on-going program is started and a new set of graduates are produced, planning involves the translation of projected labor market demand into program requirements. With the lack of more specific information, this translation requires some tenuous assumption, namely a simple relationship between jobs in demand and vocational education program titles and second, stability of relationships over time.

The purpose of this study was to test the validity of these assumptions on graduates of Minnesota area vocational technical institutes. Specifically, the objectives were to:

1. Describe the pattern of jobs selected by graduates
2. Assess the stability between years of the pattern of jobs selected by graduates

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[2] Minnesota State Board of Education. "Minnesota Regulations, Chapter 6: EDU 100-119, Post Secondary Vocational-Technical Education", October 6, 1975.

3. Describe the pattern of geographic location of jobs selected by graduates
4. Assess the stability between years of the patterns of geographic locations of jobs selected by graduates
5. Assess the longitudinal stability of the patterns of jobs selected by graduates

With these objectives achieved, managers and teachers of vocational education can put labor market demand information in more valid perspective when planning and evaluating vocational education programs.

CHAPTER II

CONCEPT OF JOB SELECTION PATTERN AND STABILITY

The concept of a job selection pattern is envisioned as a description of the types of jobs selected by graduates of a vocational education program. It is an explicit description of the interface between a program of vocational education and the labor market as charted by the graduates of the selected program. It describes in a single glance the impact of a vocational education program on labor market demand in specific occupations and industries. Need for a concept of job selection pattern arises from the problems faced by educational planners in trying to use information about existing and projected labor market demand as an input into decisions concerning the plans for vocational education.[3]

As is shown in Figure 1, graduates of vocational education programs leave an "unavailable for work" category and become a part of labor market supply. Labor market supply includes all those who are working as well as those who are unemployed and actively looking for work. Labor market supply is contrasted with labor market demand. Labor market demand is a count of the various positions made available by business and industry; whereas, labor market supply is a count of people looking for work. Both labor market demand and supply exist at a given wage rate and other labor market characteristics (e.g., hiring practices, job descriptions). If there are differences between labor market supply and demand, the labor market for the given occupation and/or industry is not in equilibrium -- there are unemployed individuals, unfilled positions, or both. Any of these leads to less than maximum production and perhaps less than an optimal economic situation.

As one of the sources of labor market supply, manipulation of vocational education programs in terms of kind, size, and location is one means of influencing the balance between labor market supply and demand. It is, however, by no means the only source of manipulation nor always the most effective (e.g., changes in wages and job entry requirements are just two other manipulation devices). As vocational education becomes a larger and, therefore, significant source of labor market supply for various occupations and industries, its influence on the relationship between labor market supply and demand becomes more significant.[4]

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[3] Copa, George and Donald Irvin, "Occupational Supply and Demand Information: A Format with Implications for Planning Education for Work", Minnesota Research Coordinating Unit for Vocational Education, University of Minnesota, September, 1974.

In order to accurately assess the impact of a vocational education program on labor market demand, the specific occupations and industries selected and their geographic location must be identified. This identification would be a simple matter if graduates from a given program selected only one occupation in one industry and stayed within a 30 mile radius of the school from which they graduated. Previous follow-up studies indicate that this may be the exception rather than the general rule and

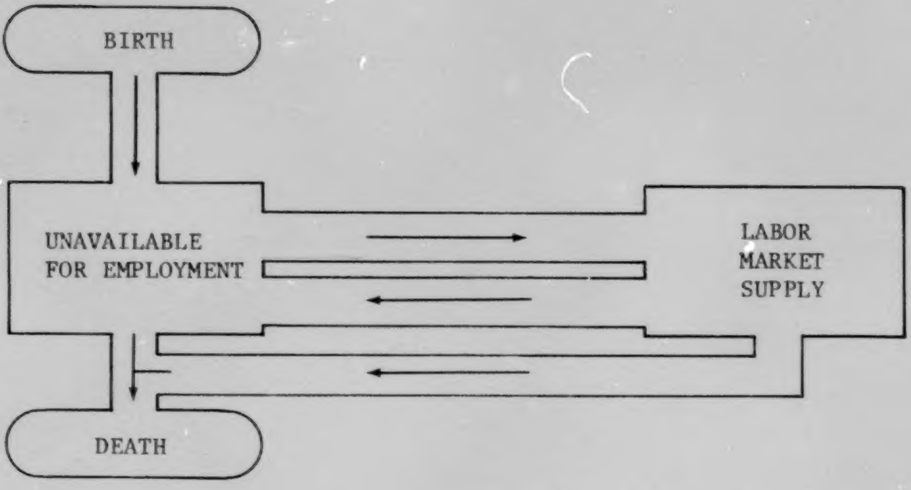

Figure 1
Flow of Individuals To and From Labor Market Supply

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[4] It is projected that graduates of Minnesota's Area Vocational Technical Institutes fill one out of every five or six job openings in Minnesota each year.

that the breadth of occupations and/or industries selected varies widely between vocational education program areas. Therefore, in order to describe with accuracy the transition from education to work, the concept of a job selection pattern seems of practical worth.

DEFINING A JOB SELECTION PATTERN

Job selection defines the job an individual eventually enters; it differs from vocational choice which is an expression of the job which the individual says he will probably enter. The job selection pattern is most useful if described in dimensions relevant to the labor market. Five dimensions used by the U.S. Department of Labor in its series dealing with Tomorrow's Manpower Needs are size, occupation, industry, geographic area, and time.[5] Size refers to the number of positions likely to be available. Occupation describes the major function being performed on a job (e.g., secretary, welder, sales manager). Industry refers to the type of business in which the function is performed (e.g., hardward store, milk processing plant, automobile assembly plant). Geographic area refers to the place where the job is located (e.g., St. Cloud, Stearns County, Economic Region VII, Minnesota, United States). Time refers to when the job is available (e.g., tomorrow, next month, next year, five years from now). If job selection patterns are to be used in relating labor market demand information to vocational education programs, it seems apparent that the patterns must at least contain these five dimensions.

A preliminary job selection pattern containing size and occupation dimensions was envisioned in the introduction to a report of a follow-up study of vocational education graduates in Pennsylvania.[6] The authors hypothesized that vocational education programs interface with occupations in three basic patterns: (1) graduates of a given program select one occupation, (2) graduates of a given program select several related occupations, and (3) graduates of several different programs select the same occupation. The concept of the interface between vocational education programs and the labor market was expanded in this report to include the dimensions of both occupation and industry. Some typical prototype patterns of job selection hypothesized for graduates of vocational education programs are shown in Figure 2. Pattern I shows graduates who select jobs in a single occupation, but work in several different industries (graduates of a secretarial program might be an example). Pattern II shows graduates who select jobs in a single occupation and industry (graduates of the nursing program might be an example). Pattern III shows graduates who select jobs in several occupations within a single industry (graduates of an agriculture program might be an example). As can be seen, many other combinations are possible and likely. A complete description of a job, however, requires both the industry and occupation dimension -- both are necessary in anticipating the likely impact of changes in labor market demand on the job selection opportunities

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[5] U.S. Department of Labor, Bureau of Labor Statistics. "Tomorrow's Manpower Needs", a series of bulletins and supplements.

[6] Senier, John. "Post-High School Activities of 1971 Public Secondary Vocational Graduates", Research Coordinating Unit for Vocational Education, Pennsylvania Department of Education, January, 1974.

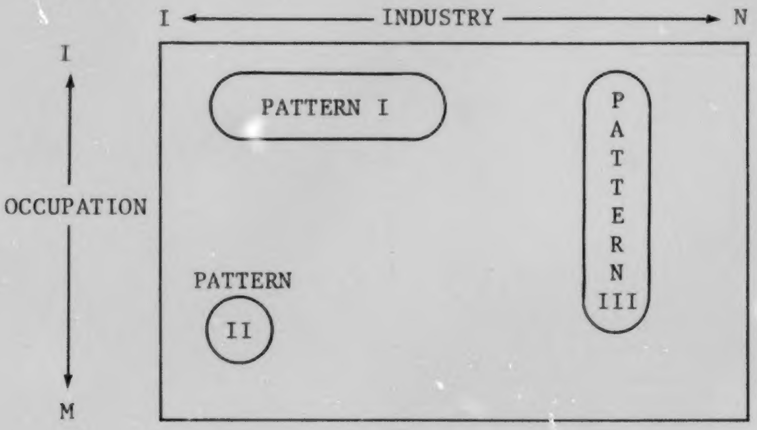

Figure 2. Types of Job Selection Patterns

of vocational education program graduates. Add to these two dimensions the dimension of geographic location and time and the pattern becomes even more precise and meaningful in that the job selection pattern documents where and when jobs were selected.

STABILITY OF JOB SELECTION PATTERNS

Stability of job selection patterns as used in this report refers to the degree to which patterns remain the same over time. That is, do the graduates of the auto mechanics program select jobs in similar occupations and industries in the same proportions from one year to the next. The purpose of this assessment is to determine if the patterns are stable enough so that valid planning can be done in relating vocational education programs to the labor market. If the patterns are stable, even if they are complex, they can be used to plan the future impact of a vocational education program on the labor market in terms of jobs likely to be selected by graduates. If the patterns are unstable, and the instability cannot be explained, labor market information is of much less use in planning the kinds of vocational education programs needed in the future.

There are many factors which influence the decision to participate in the labor force and, more specifically, the selection of a particular job. Factors which influence the decision to participate in the labor force include: Being part of a family unit, sex, income of spouse, number of children, marital status, custom, tradition, and sex discrimination, age discrimination, racial discrimination, wage rates, relative desire for work over leisure, desire for self actualization, educational attainment, job opportunities, physical abilities, and previous work experiences.[7]

Obviously, many of these same factors along with others influence the specific job selected. Some factors which research has identified as correlates of vocational choice (not the same as job selected, but related) are culture, social class, race, geographic region (urban and rural), community (peers and ethnic groups), family (father's occupation, parental identification), school (as agent of vocationalization), general aptitude, interest, and personality.[8] Both the factors influencing the decision to participate in the labor force and the decision on which job is selected can influence the stability of job selection patterns from year to year.

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[7] Kaufman, Jacob J. and John M. Sumansky. "Manpower Planning, Occupational Education, and the Decision to Participate in the Labor Force", Center for Occupational Education, North Carolina State University at Raleigh, 1974.

PAST ASSESSMENT OF JOB SELECTION AND STABILITY IN VOCATIONAL EDUCATION

Assessment of jobs selected by vocational education program graduates has been accomplished through follow-up studies. A review of thirty follow-up studies of vocational education graduates sampled to represent various educational levels (i.e. high school, post-high school, adult) and geographic areas of the United States was made. The conclusions reached were that: (1) validity of data varied considerably given the wide range in percent of sample responding, (2) there was little or no conformity in the occupational titles or categories used to describe the jobs selected by graduates (many studies used only vocational education program clusters to describe occupations), and (3) few studies were done on a regular schedule (e.g., annually) which would result in data to assess stability of job selection patterns over time.

Given the concept of stability described earlier, follow-up data of a cross sectional nature, that is, repeated each year for a number of years on the new graduates with the same basic questions asked is required. The data available from the Minnesota Vocational Follow-Up System[9] is one of few sources of data meeting these requirements.

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[8] Cities, John O. Vocational Psychology - The Study of Vocational Behavior and Development, Chapter 13, "Research in Vocational Psychology", McGraw-Hill Book Company, New York, 1969.

No past studies in vocational education were found which addressed stability of job selection patterns of vocational education program graduates. This finding is likely due to lack of an adequate data base for studies of this nature in the past.

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[9] The Minnesota Vocational Follow-Up System follows-up all the graduates of Minnesota's Area Vocational Technical Institutes full-time day programs at one year after graduation. The system was initiated and operated under the direction of Dr. David Pucel, Department of Vocational and Technical Education, University of Minnesota from 1970 to 1975. In 1975, operation of the System was shifted to National Computer Systems, Inc. based in Minneapolis, Minnesota.

CHAPTER III

DESIGN OF STUDY

The objectives of this study required the collection and analysis of occupations selected by graduates of Minnesota's area vocational technical instututes. Information of this nature was available through the Minnesota Vocational Follow-Up System.

SELECTION OF SAMPLE PROGRAMS

Although information was available for all programs in Minnesota's area vocational technical institutes, some of the particular information of interest had been collected but not coded or stored on computer files. Given limited time and resources, it was, therefore, not possible to complete the objectives of this study for each individual program. However, in order to maximize the generalizability of the results, a purposive sample of the program areas was selected. Program areas were selected using three criteria. First, at least one program area was selected from each of the traditional vocational education areas (i.e., agriculture, business and office, distributive, health, home economics, industrial and technical). Second, at least one program area was selected which was directed toward each of the basic categories of occupations of relevance to vocational education (i.e., farmers, craftsmen, operatives, sales workers, service workers, and clerical workers). Third, at least one program area was selected which traditionally had enrolled persons of each sex. Using these criteria, the program areas selected are identified in Table 1. The exact titles of the programs included in each program area are given in Appendix I.

SELECTION OF SAMPLE OF GRADUATES IN EACH PROGRAM

The number of graduates from each of the programs selected for this study varied considerably. In order to maintain feasibility in conducting

TABLE 1

PROGRAM AREAS INCLUDED IN SAMPLE AND THEIR ATTRIBUTES

Program Area	Attributes
Agri-Technology	From agricultural education area; preparation for farmers and operatives; enrollment highly males
Automotive	From industrial education area; preparation for craftsmen; enrollment highly males
Clerical Training	From business and office education area; preparation for clerical workers; enrollment highly female
Chefs, Cooks, and Food Preparation	From occupational home economics area; preparation for service workers; enrollment both male and female
Electronics	From technical education area; preparation for craftsmen; enrollment highly male
Machine Shop	From industrial education area; preparation for craftsmen; enrollment highly male
Practical Nursing	From health education area; preparation for service workers; enrollment highly female
Sales and Business Management	From distributive education area; preparation for sales workers; enrollment highly male

Note. Data on graduate of the selected programs for the school year 1969-70, 1970-71, and 1971-72 were used in this study.

the study, random samples of graduates, rather than the full population of graduates, was used for programs having a large number of graduates. Samples were chosen so as to restrict sample size to approximately 100-150 graduates who were employed for each program for each year. In programs where the number of graduates was less than 150, all graduates who were working were included in the sample.

DATA COLLECTION

As already noted, data for this study were collected from the data base established by the Minnesota Vocational Follow-Up System. Since some of the needed data was not stored on computer files, reference had to be made to the original follow-up questionnaire used by the Vocational Follow-Up System and stored in micro film form. A copy of the portion of the questionnaire from which data for this study were collected is shown in Appendix II.

The data items collected from the Vocational Follow-Up Systems' questionnaire were the first job and present job of selected program graduates. First job refers to the first job obtained by the graduate after leaving the area vocational technical institute. Present job refers to the job held by the graduate approximately one year after graduation; in some cases, it is the same as the first job. The latter job, referred to as "job after one year", was used for the major share of the analyses in this study because it is thought to represent a more stable indicator of the type of job graduates actually hold for some period of time and, therefore, represents a more valid measure of impact on the labor market.

For each of these jobs, four items of descriptive information were collected. These were: (1) the geographic location of the job (by county in Minnesota, surrounding states, and other states), (2) occupational category (in terms of 439 categories), (3) industry category (in terms of 228 categories), and (4) time status (part or full time). The occupational and industry categories used to classify the jobs of graduates were those used by the U.S. Census of Population.[10] These categories were used because: (1) the categories are detailed and documented, thereby, providing a validated coding system used by the Census Bureau over a number of years and (2) their categories are used to describe the labor force in several publications, thereby, providing compatible data to ease comparisons and interpretations. A list of occupation and industry titles used in the classification scheme is shown in Apendix III. Occupations refer to the type of function performed on the job (e.g., clerk) and industry refers to the type of business in which the function is performed (e.g., shoe store). In combination, these two descriptions provide an accurate and complete description of a "job" relative to the labor market.

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[10] U.S. Department of Commerce, Bureau of Census. "Alphabetic Index of Industries and Occupations", 1970 Census of Population, June, 1971.

DATA ANALYSIS

The major share of data analysis was done by compiling frequency distributions for each major data item for graduates of each school year for each program area. Data analyses corresponding to each of the objectives of the study were completed. Jobs were described by occupation, by industry, and by a combination of these two dimensions (referred to as an occupation by industry matrix). Percentages were used to identify the importance of various jobs and geographic locations in making up a job selection pattern of graduates for each program area and to compare patterns from one year to the next. Chi square analysis was used to assess if change in patterns over time was statistically significant.

CHAPTER IV

ANALYSIS OF DATA

This chapter on data analysis first describes some basic information about the group of graduates sampled and then addresses each of the problems toward which this study was directed. Following the presentation of summarized data, a brief discussion of results is included. More detailed data is provided in the Appendices.

BACKGROUND DATA

Graduates of twenty-eight of Minnesota's present thirty-four area vocational technical institutes were included in the sample. These schools cover all eleven of the State's economic regions and both urban and rural areas. The schools included and not included are shown in Figure 3. Those not included are the newer institutes; they were not included because they did not have students graduating in all of the school years used in this study (1969-70 to 1971-72). Table 2 shows, for each program and year, the number of returning follow-up questionnaires,[11] the number who were employed after one year, and the sample size used in this study.

As explained previously in Chapter II and shown in Tables 1 and 2, eight vocational education program areas were selected to represent programs in each of the traditional program areas (e.g., agriculture, distributive), provide training for one of several major occupational groups (e.g., clerical, sales), and provide a sample of graduates with both males and females. A sample of approximately 100-150 graduates who completed the follow-up questionnaire and were employed within the first year after graduation was randomly selected for each program for each of the years 1969-70, 1970-71, and 1971-72. Where the total number of graduates with complete follow-up data and employed was less than 100, all of the

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[11] The Minnesota Vocational Follow-Up System maintains a return rate of approximately 80 percent as an average over all post-secondary area vocational-technical institute graduates.

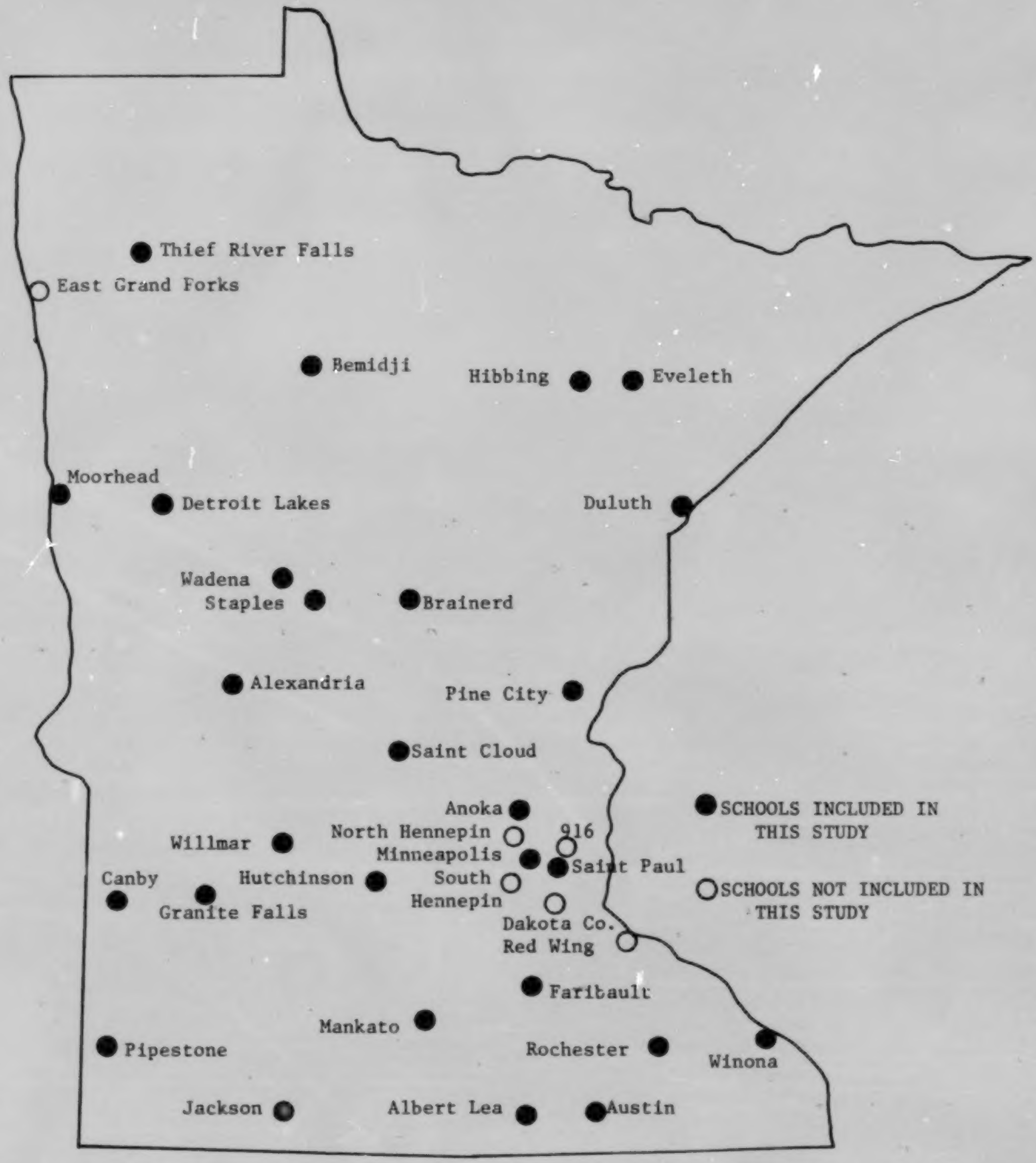

Thief River Falls
East Grand Forks
Bemidji
Hibbing
Eveleth
Moorhead
Detroit Lakes
Duluth
Wadena
Staples
Brainerd
Alexandria
Pine City
Saint Cloud
Anoka
North Hennepin
916
Willmar
Minneapolis
Saint Paul
Canby
Hutchinson
South Hennepin
Granite Falls
Dakota Co.
Red Wing
Faribault
Mankato
Pipestone
Rochester
Winona
Jackson
Albert Lea
Austin
● SCHOOLS INCLUDED IN THIS STUDY
○ SCHOOLS NOT INCLUDED IN THIS STUDY

FIGURE 3. MINNESOTA'S AREA VOCATIONAL TECHNICAL INSTITUTES INCLUDED AND NOT INCLUDED IN THE SAMPLE PROGRAM AREAS

TABLE 2

SAMPLE OF GRADUATES FROM EACH SELECTED VOCATIONAL PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES FOR EACH SCHOOL YEARS 1969-70 TO 1971-72

Program/Year	Returning Follow-Up Questionnaire	Employed		Sample	
	No.	No.	%	No.	%^{a}
Electronics					
1969-70	196	158	80.6	100	63.3
1970-71	192	154	80.2	102	66.2
1971-72	290	247	85.2	122	48.6
TOTAL	678	559	82.4	324	58.0
Practical Nursing					
1969-70	300	297	99.0	130	43.8
1970-71	653	630	96.5	125	19.8
1971-72	447	432	96.6	110	25.5
TOTAL	1,400	1,359	97.1	365	26.9
Automotive					
1969-70	272	228	83.8	106	46.5
1970-71	365	329	90.1	102	31.0
1971-72	387	350	90.4	111	31.7
TOTAL	1,024	907	88.6	319	35.2
Machine Shop					
1969-70	163	131	80.4	82	62.6
1970-71	135	120	88.9	108	90.0
1971-72	118	107	90.7	106	99.1
TOTAL	416	358	86.1	296	82.7
Chefs, Cooks, and Food Preparation					
1969-70	111	90	81.1	82	91.1
1970-71	160	128	80.0	75	58.6
1971-72	213	192	80.1	96	50.0
TOTAL	484	410	84.7	253	61.7
Agri-Technology					
1969-70	32	29	90.6	24	82.8
1970-71	65	61	93.8	55	90.2
1971-72	62	60	96.8	60	100.0
TOTAL	159	150	94.3	139	92.7
Sales and Business Management					
1969-70	75	65	86.7	62	95.4
1970-71	145	132	91.0	110	83.3
1971-72	191	182	95.3	116	63.7
TOTAL	411	379	92.2	288	76.0

Table 2 (continued)

Program/Year	Returning Follow-Up Questionnaire	Employed		Sample	
	No.	No.	%	No.	%[a]
Clerical Training					
1969-70	379	342	90.2	117	34.2
1970-71	491	440	89.6	102	23.2
1971-72	392	364	92.9	120	33.0
TOTAL	1,262	1,146	91.0	339	29.6

[a] Sample percent is of those employed.

graduates were used. The smallest group of graduates for a single program and year was 24 of the agri-technology program in 1969-70. Only five of the sample groups were 75 or less for a given program and year. Where the number of graduates who had complete follow-up data and who were employed was much larger than 100, a random sample of approximately 100 was selected.

The number of graduates in the samples working full and part time for each program and year for first job and job after one year is shown in Table 3; in most cases fewer than ten percent of the sample were working part time - the highest program area being practical nursing. The lowest

TABLE 3

FULL-TIME AND PART-TIME STATUS OF FIRST JOB AND JOB AFTER ONE YEAR BY SAMPLE OF GRADUATES FROM SAMPLE PROGRAM AREAS IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES SCHOOL YEARS 1969-70 TO 1971-72

Program Area	Total Number	First Job % Full-time	First Job % Part-time	Job After One Year % Full-time	Job After One Year % Part-time
Agri-Technology	118	93.2	6.8	91.5	8.5
Automotive	281	95.0	5.0	96.1	3.9
Chefs, Cooks, and Food Preparation	227	90.7	9.3	94.7	5.3
Clerical	291	92.1	7.9	93.5	6.5
Electronics	273	91.9	8.1	95.2	4.8
Machine Shop	253	97.6	2.4	98.0	2.0
Practical Nursing	345	87.5	2.5	86.9	3.1
Sales and Business Management	251	89.2	10.8	95.2	4.8

percentage of part-time employment for both first job and job after one year, and for all three years occurred among the machine shop graduates; only 2.4 percent of first jobs and 2.0 percent of jobs after one year were part-time. The agri-technology and automotive graduates also had low rates of part-time employment. The percentages of part-time workers decreased from first job to job after one year in most cases. After observing that most of the graduates who were sampled were working full-time in both their first job and job after one year, it was decided to conduct the remainder of the data analysis with the total sample, grouping those working full and part time.

The remaining sections of this Chapter are focused on the specific objectives of this study. Repeating them from Chapter 1, but in more specific form, they are as follows:

1. Describe the pattern of "jobs after one year" selected by graduates of a selected sample of programs.
2. Assess the stability of job patterns for "jobs after one year" selected by graduates of a selected sample of programs over a three year period.
3. Describe the pattern of geographic location of "jobs after one year" selected by graduates of a selected sample of programs.
4. Assess the stability of patterns of geographic locations of "jobs after one year" selected by graduates of a selected sample of programs over a three year period.
5. Assess the stability between job patterns of "first jobs" and "jobs after one year" selected by graduates of a selected sample of programs over a three year period.

JOB SELECTION PATTERN FOR JOB AFTER ONE YEAR

There are 228 specific industries and 439 specific occupations listed in the Alphabetical Index of Industries and Occupations published by the United States Department of Commerce which was used in coding the first jobs and job after one year held by the sample of graduates in this study. When all three years of data are combined for each program area, students in seven of eight program areas examined had over sixty different specific occupation by industry combinations (different jobs). Of these seven, graduates of each of five programs, automotive, clerical, electronics, machine shop, and sales and business management selected over 100 specific jobs (see table 4). The highest number of different jobs held was in the clerical program; out of the sample of 291 graduates, there were 172 different types of jobs selected. In comparison, there were only 14 different specific jobs taken by the sample of 345 practical nursing graduates.

TABLE 4

NUMBER OF SPECIFIC INDUSTRY AND OCCUPATION CATEGORIES REPRESENTED IN JOB SELECTION PATTERNS OF SAMPLE OF GRADUATES IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Program Area	Number of Specific Industries	Number of Specific Occupations	Number of Specific Occupation/Industry Combinations
Agri-Technology	40	32	63
Automotive	56	54	105
Chefs, Cooks and Food Preparation	42	37	81
Clerical Training	83	54	172
Electronics	67	62	125
Machine Shop	62	57	127
Practical Nursing	12	10	14
Sales and Business Management	66	59	122
TOTAL POSSIBLE	228	439	100,092

Due to the large number of specific industry and occupation combinations selected by graduates, a specific industry by specific occupation matrix for each program area was cumbersome and space consuming to display in this Chapter. Therefore, a listing of the specific occupation and specific industry of jobs held by graduates of the eight program areas one year after graduation is given in Appendix IV. As an alternative, a major industry by major occupation matrix is used to display job selection patterns in this Chapter. The pattern of jobs selected by graduates is shown by use of various size circles displayed in the matrix cells and used to represent the percentage of total graduates selecting jobs falling in each cell. In this way, the visual impression of a "pattern" is created to describe the relationship between the selected program areas and the labor market as charted by the graduates of the program areas.

The specific industries have been divided into twelve major industry groups, and the specific occupations have been divided into nine major occupation groups (see Table 5). Twenty-five or more different major occupation by industry combinations (out of a possible 108) were selected by graduates of seven of the eight sample program areas (see Table 6). In only one, practical nursing, were fewer than ten different major jobs represented.

TABLE 5

MAJOR OCCUPATIONAL AND INDUSTRY GROUPS USED TO SUMMARIZE JOB SELECTION PATTERNS

Major Occupations	Major Industries
Professional, Technical	Agriculture, Forestry, and Fisheries
Managers and Administrators	Mining
Sales Workers	Construction
Clerical Workers	Manufacturing
Craftsmen	Transportation, Communications and Public Utilities
Operatives	Wholesale and Retail Trade
Laborers, Except Farm	Finance, Insurance, and Real Estate
Farmers, Farm Managers, and Farm Laborers	Business and Repair Services
Service Workers	Entertainment
	Professional Services
	Public Administration

TABLE 6

NUMBER OF MAJOR INDUSTRY AND OCCUPATION CATEGORIES REPRESENTED IN JOB SELECTION PATTERNS OF SAMPLE OF GRADUATES IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

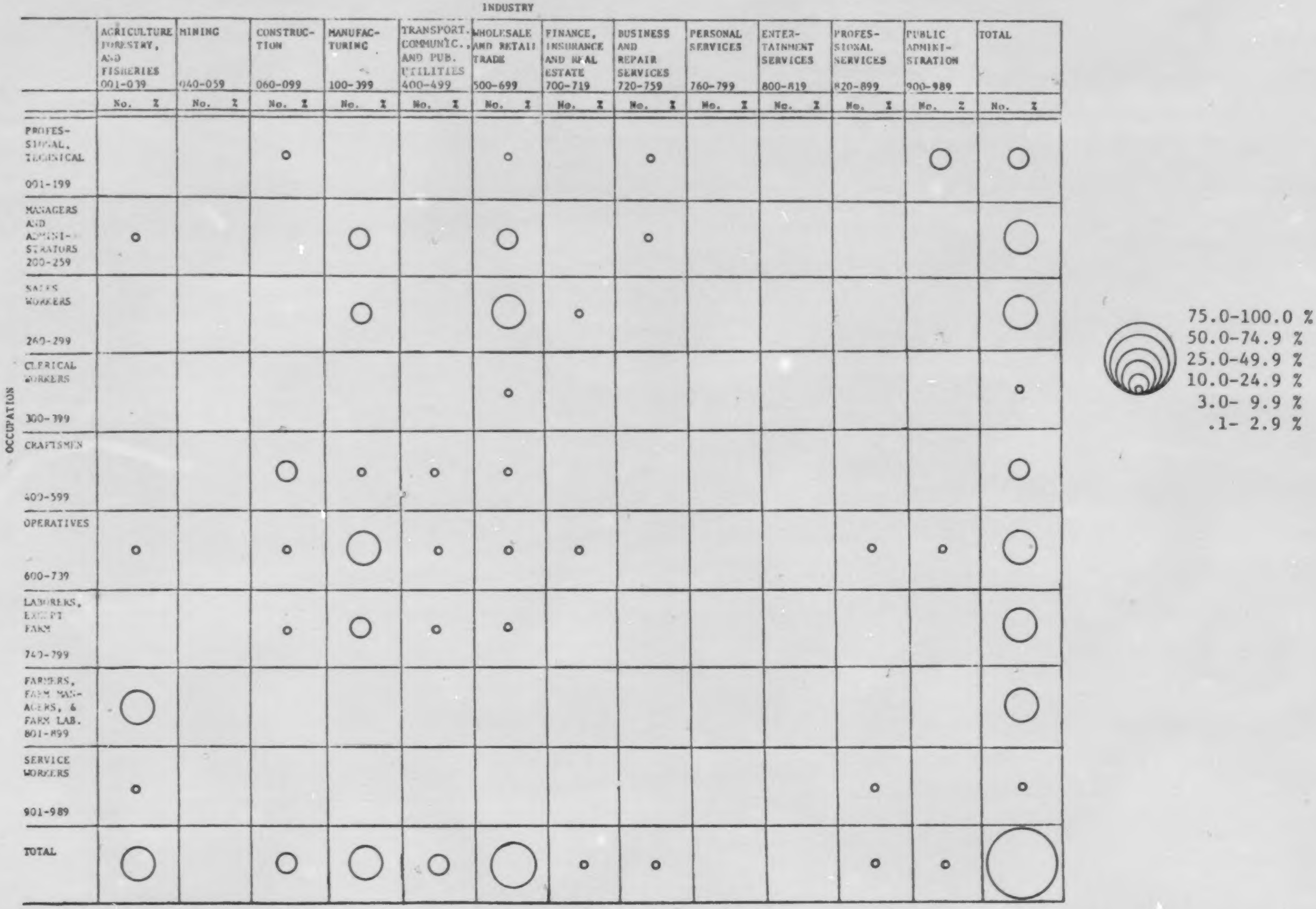
Program Area	Number of Specific Industries	Number of Specific Occupations	Number of Major Occupation/Industry Combinations
Agri-Technology	9	9	31
Automotive	11	9	35
Chefs, Cooks, and Food Preparation	9	9	26
Clerical Training	11	8	28
Electronics	11	9	36
Maching Shop	10	11	32
Practical Nursing	4	5	8
Sales and Business Management	11	9	37
TOTAL POSSIBLE	12	9	108

AGRI-TECHNOLOGY PROGRAM AREA

Looking separately at the job selection pattern for graduates of each program area over the three years, no single occupation accounted for more than one-fifth of the graduates employed of the agri-technology students (see Table 7). About nineteen percent (19.2) were employed as operatives, 16.9 percent as farmers, farm managers, and farm laborers, 12.7 percent as managers and administrators, and 11.8 percent as non-farm laborers. This employment was centered in three industries, wholesale and retail trade with 30.3 percent, manufacturing with 24.6 percent and agriculture, forestry, and fisheries with 20.2 percent. Two major jobs (an occupation and industry combination) in the occupation-industry matrix each employed 16.9 percent of the graduates. They were sales workers in the wholesale and retail trades industry, and farmers, farm managers, and farm laborers

TABLE 7

MAJOR OCCUPATIONS AND INDUSTRIES OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE AGRI-TECHNOLOGY PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72



in the agriculture, forestry and fisheries industry. Only operatives in the manufacturing industries with 11.0 percent of the graduates employed more than 6.0 percent of the graduates.

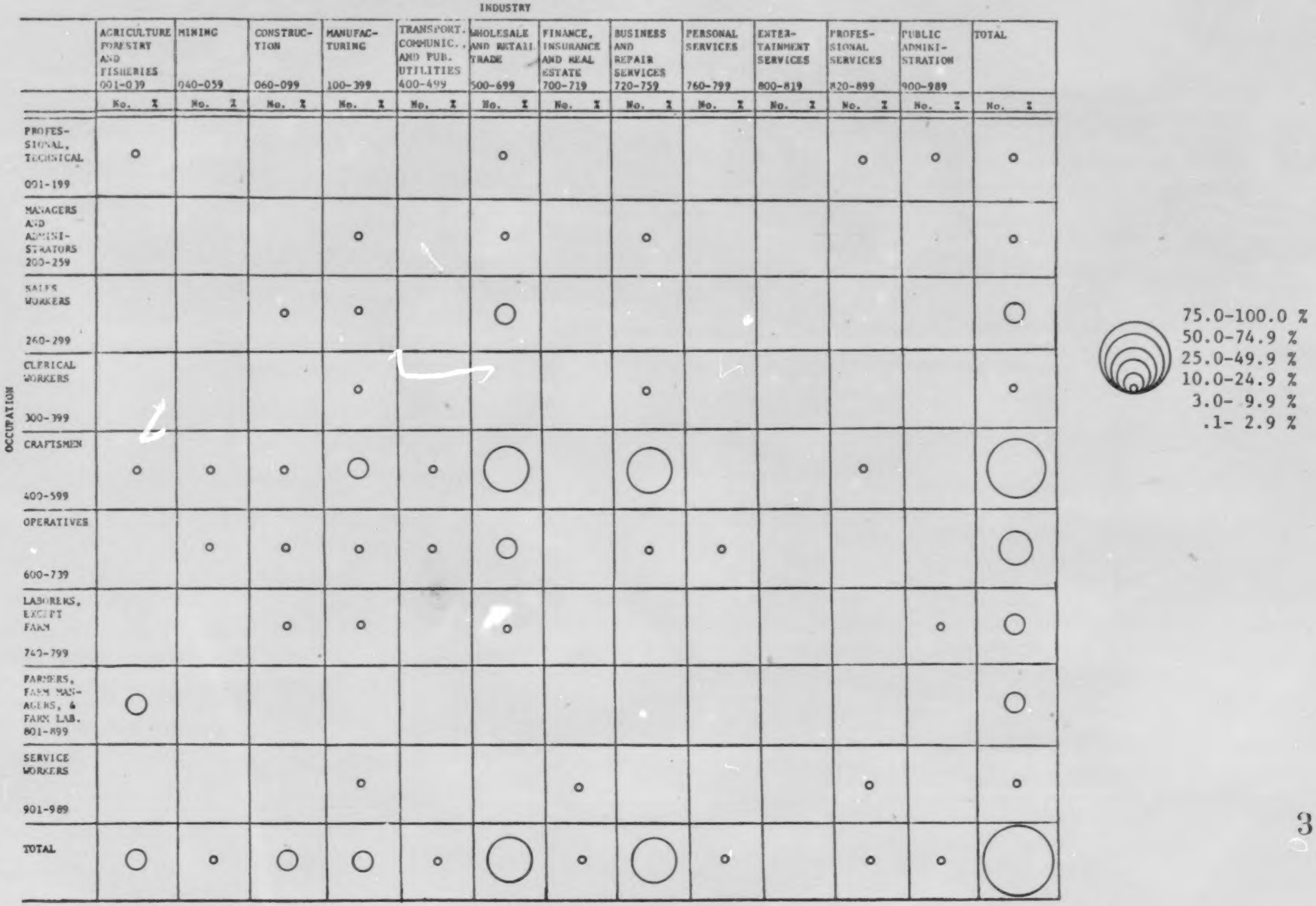
Of the programs examined, the agri-business program showed the most diversification in the employment of its graduates. The three specific combinations of occupation and industry with the largest percentage of graduates are: Farm laborers and wage workers in agricultural production with 11.9 percent, farmers in agricultural production with 7.6 percent, and managers and administrators of farm and garden supply stores with 5.9 percent (see Appendix IV). Together, these three jobs account for only 25.4 percent of the employed agri-technology graduates during the three years. Of the remaining 74.6 percent, no specific job was selected by more than four graduates.

AUTOMOTIVE PROGRAM AREA

About seventy-one (70.7) percent of the automotive program graduates selected jobs as craftsmen (see Table 8). The only other important major occupational category was operatives, with 12.2 percent. These graduates largely selected two major industries, wholesale and retail trade with 48.6 percent, and business and repair services with 29.2 percent. Manufacturing with 8.4 percent, and agriculture, forestry, and fisheries with 5.1 percent were the next largest industry groups. Two single cells in the occupation-industry matrix accounted for jobs selected by nearly 64 percent of the graduates. Both of these were in the craftsmen occupational category. Craftsmen in the wholesale and retail trade industry accounted for 36.7 percent, and craftsmen in the business and repair services accounted for 27.0 percent. The two specific combinations of occupation and industry which were selected by the largest percentage of graduates are automobile mechanics in the motor vehicle dealers industry with 24.2 percent, and automobile mechanics in the automobile repair and related services industry with 23.8 percent (see Appendix IV). No other specific occupation and industry was selected by

TABLE 8

MAJOR OCCUPATIONS AND INDUSTRIES OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF THE GRADUATES OF THE AUTOMOTIVE PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72



INDUSTRY

OCCUPATION	AGRICULTURE FORESTRY AND FISHERIES 001-039 No. %	MINING 040-059 No. %	CONSTRUCTION 060-099 No. %	MANUFACTURING 100-399 No. %	TRANSPORT. COMMUNIC., AND PUB. UTILITIES 400-499 No. %	WHOLESALE AND RETAIL TRADE 500-699 No. %	FINANCE, INSURANCE AND REAL ESTATE 700-719 No. %	BUSINESS AND REPAIR SERVICES 720-759 No. %	PERSONAL SERVICES 760-799 No. %	ENTERTAINMENT SERVICES 800-819 No. %	PROFESSIONAL SERVICES 820-899 No. %	PUBLIC ADMINISTRATION 900-989 No. %	TOTAL No. %
PROFESSIONAL, TECHNICAL 001-199	○					○					○	○	○
MANAGERS AND ADMINISTRATORS 200-259				○		○		○					○
SALES WORKERS 260-299			○	○		○							○
CLERICAL WORKERS 300-399				○				○					○
CRAFTSMEN 400-599	○	○	○	○	○	○		○			○		○
OPERATIVES 600-739		○	○	○	○	○		○	○				○
LABORERS, EXCEPT FARM 740-799			○	○		○						○	○
FARMERS, FARM MANAGERS, & FARM LAB. 801-899	○												○
SERVICE WORKERS 901-989				○			○				○		○
TOTAL	○	○	○	○	○	○	○	○	○		○	○	○

75.0-100.0 %
50.0-74.9 %
25.0-49.9 %
10.0-24.9 %
3.0- 9.9 %
.1- 2.9 %

more than three percent of the sample of graduates of the automotive program.

CHEFS, COOKS, AND FOOD PREPARATION PROGRAM AREA

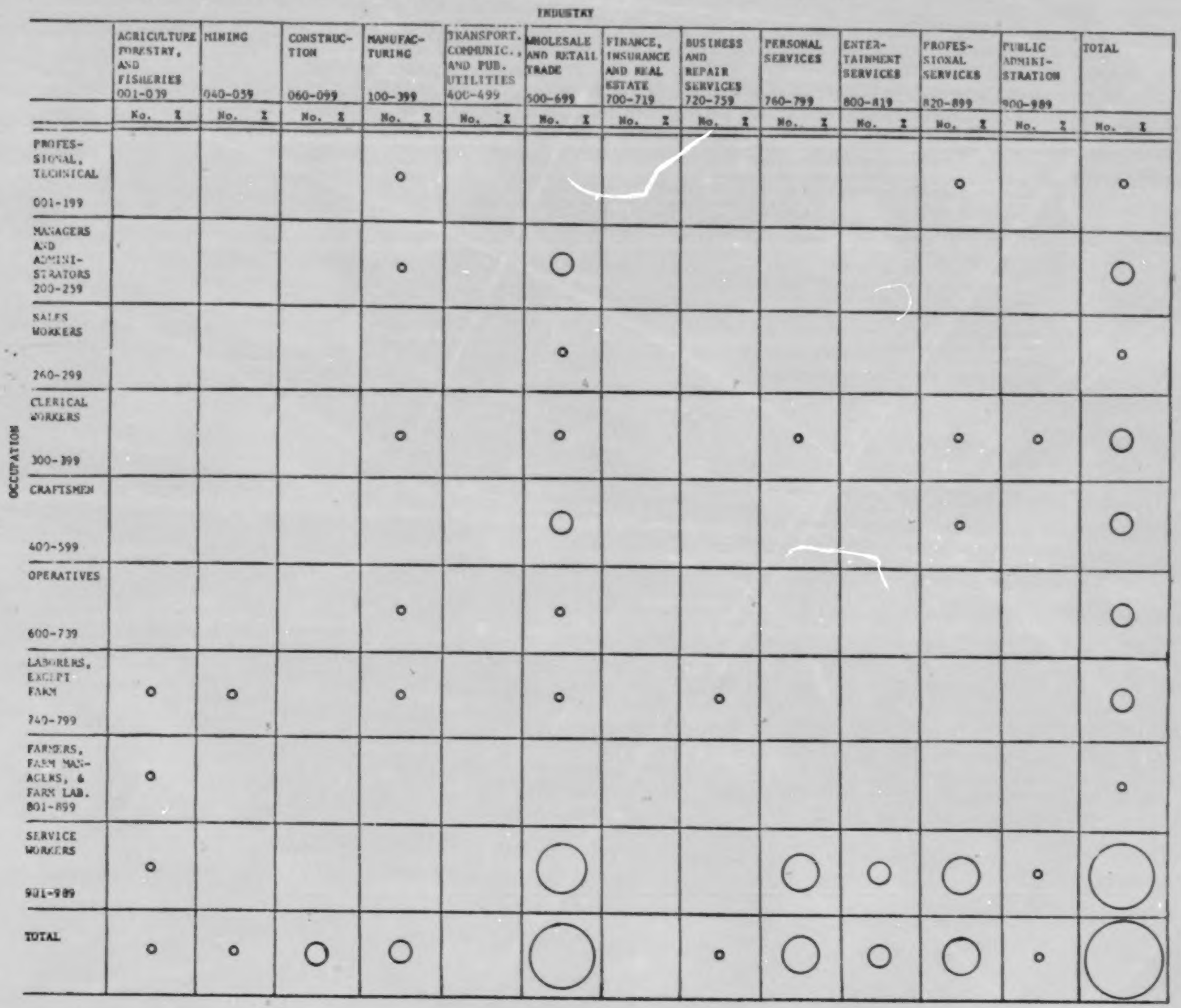
About seventy-four (73.6) percent of the sample of graduates of the chefs, cooks, and food preparation program selected service workers occupations (see Table 9). Managers and administrators accounted for 8.3 percent of the graduates. No other major occupational group accounted for over 5.0 percent. Over half of the graduates selected employment in the wholesale and retail trades. There were two other major industries selected by a high percent of graduates - personal service (18.5%), and professional related services (14.5%). Three major occupation/industry combinations were selected by a large share of graduates and all three were in service worker occupations. About thirty-six percent (35.7) worked in wholesale and retail trade, 18.1 percent worked in personal service, and 12.8 percent worked in professional related services. The two specific categories of occupation and industry selected by a high percent of graduates were: Cooks in eating and drinking places with 25.6 percent and cooks in hotels and motels with 14.5 percent. No other specific occupations and industry were selected by more than four percent of graduates except eating and drinking place managers which was selected by 7 percent.

CLERICAL PROGRAM AREA

Seventy-nine (79.0) percent of the graduates of the clerical program selected jobs as clerical workers (see Table 10). Other than practical nursing, of the program examined, the clerical program has the highest percentage of graduates employed in a single major occupational group. Service worker occupations were selected by about seven (7.5) percent of

TABLE 9

MAJOR OCCUPATIONS AND INDUSTRIES OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE CHEFS, COOKS, AND FOOD PREPARATION PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72



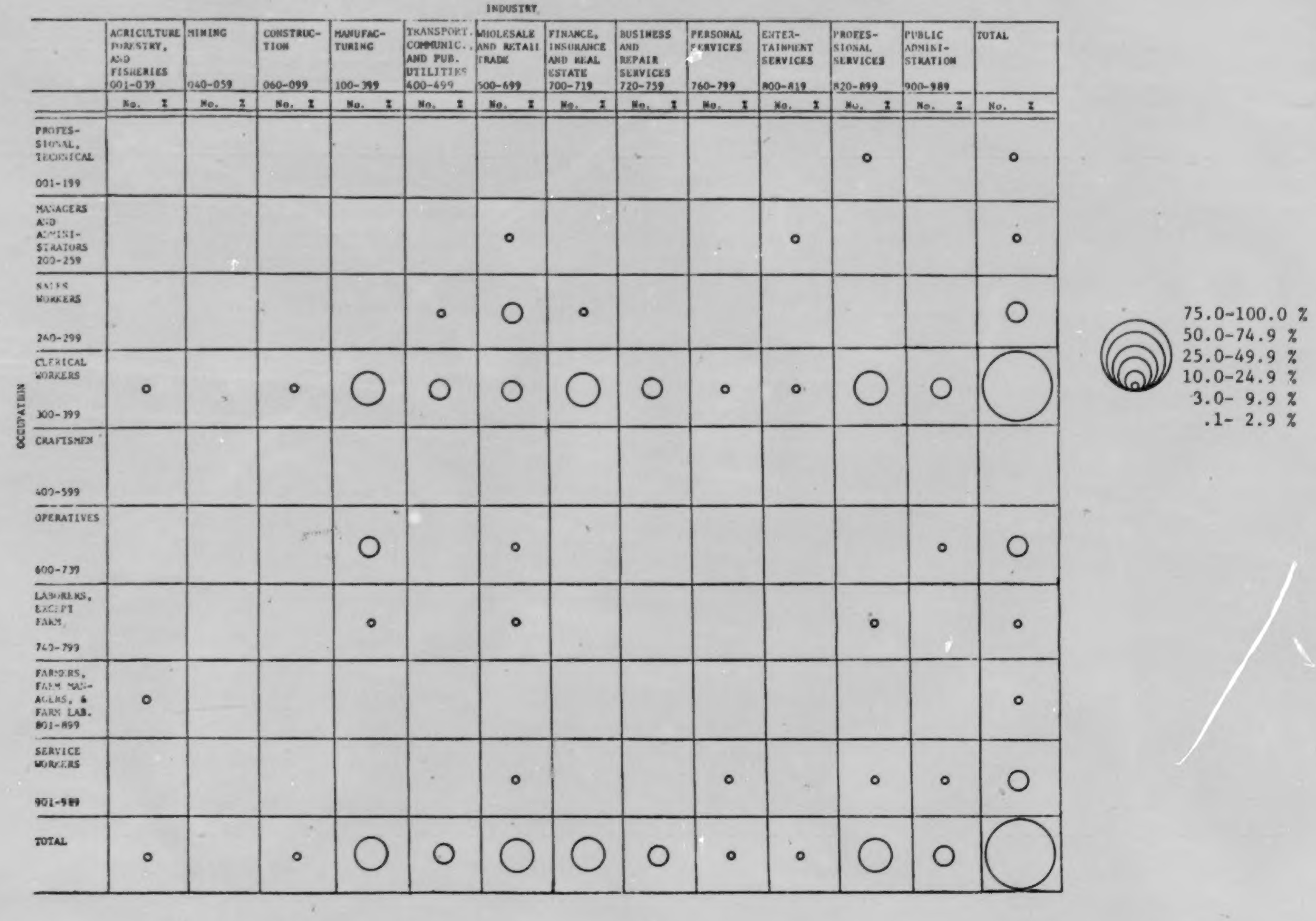
INDUSTRY

OCCUPATION	AGRICULTURE FORESTRY, AND FISHERIES 001-039 No. %	MINING 040-059 No. %	CONSTRUCTION 060-099 No. %	MANUFACTURING 100-399 No. %	TRANSPORT. COMMUNIC., AND PUB. UTILITIES 400-499 No. %	WHOLESALE AND RETAIL TRADE 500-699 No. %	FINANCE, INSURANCE AND REAL ESTATE 700-719 No. %	BUSINESS AND REPAIR SERVICES 720-759 No. %	PERSONAL SERVICES 760-799 No. %	ENTERTAINMENT SERVICES 800-819 No. %	PROFESSIONAL SERVICES 820-899 No. %	PUBLIC ADMINISTRATION 900-989 No. %	TOTAL No. %
PROFESSIONAL, TECHNICAL 001-199				◦							◦		◦
MANAGERS AND ADMINISTRATORS 200-259				◦		○							○
SALES WORKERS 260-299						◦							◦
CLERICAL WORKERS 300-399				◦		◦			◦		◦	◦	○
CRAFTSMEN 400-599						○					◦		○
OPERATIVES 600-739				◦		◦							○
LABORERS, EXCEPT FARM 740-799	◦	◦		◦		◦		◦					○
FARMERS, FARM MANAGERS, & FARM LAB. 801-899	◦												◦
SERVICE WORKERS 901-989	◦					◯			○	○	○	◦	◯
TOTAL	◦	◦	○	○		◯		◦	○	○	○	◦	◯

75.0-100.0 %
50.0-74.9 %
25.0-49.9 %
10.0-24.9 %
3.0- 9.9 %
.1- 2.9 %

TABLE 10

MAJOR OCCUPATIONS AND INDUSTRIES OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE CLERICAL TRAINING PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72



clerical program area graduates. Over 75.0 percent of these graduates selected jobs in four major industries. About twenty-four (23.9) percent selected jobs in professional related services, 19.6 percent in manufacturing, and 16.8 percent in both the wholesale and retail trade, and finance, insurance, and real estate. Public administration accounted for another 8.6 percent of the graduates.

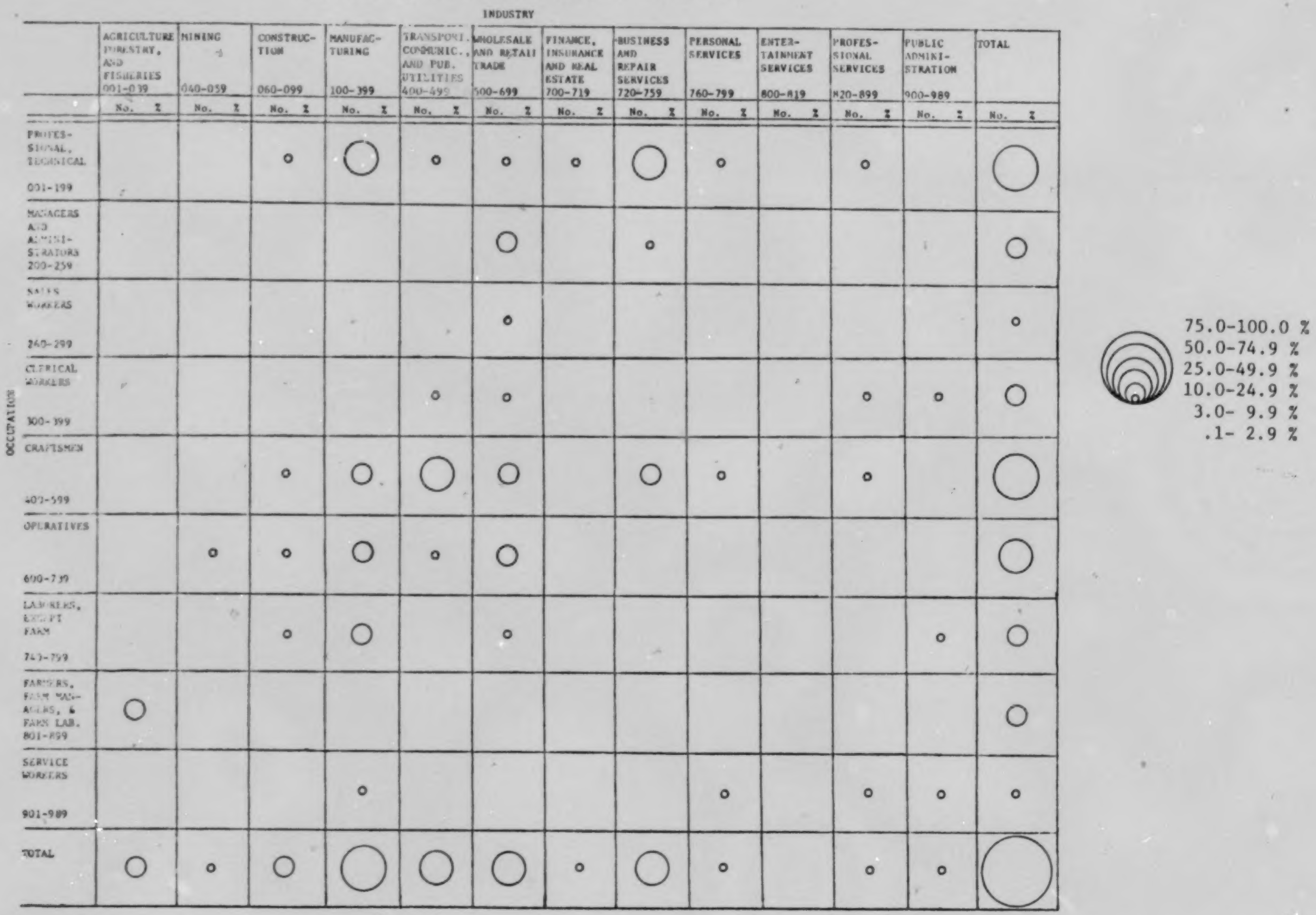
The concentration of employment in one major occupation and diffusion of employment in many industries may be because clerical skills may be used in nearly every industry. This is evident by the finding that more of the specific industry categories were selected by clerical program graduates than for any other program area examined (see Appendix IV). However, there are two specific occupation categories which together account for nearly fifty percent of the sample of graduates. These are typists with 32.4 percent and secretaries with 15.8 percent.

ELECTRONICS PROGRAM AREA

Two major occupation categories accounted for over sixty-four percent of the job selected by the sample of graduates of the electronics program area (see Table 11). About 33 percent became employed in the professional-technical field, and 31.9 percent became employed as craftsmen. Operatives, with 16.1 percent, comprised the next largest major occupational category. About 30 percent of the graduates received employment in manufacturing industries while 22.7 percent were employed in the wholesale and retail trades. Transportation, communication, public utilities, and business and repair services accounted for 17.5 and 16.1 percent, respectively. The largest single cell in the occupation-industry matrix was professional-technical workers in manufacturing, with 13.9 percent. Craftsmen working in transportation, communication, and public utilities ran a close second with 12.5 percent. About 11 percent selected the professional technical field in business and repair services. The four largest specific catagories of occupation and industry are: Telephone installers

TABLE 11

MAJOR OCCUPATIONS AND INDUSTRIES OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE ELECTRONICS PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72



and repairmen in the telephone (wire and radio) industry with 11.0 percent, electrical and electronics engineering technicians in the computer programming service industry with 10.6 percent, electrical and electronics engineering technicians in the electrical machinery equipment and supplies industry, and radio and television workers in the household appliances, T.V., and radio stores industry with 7.3 percent (see Appendix IV).

MACHINE SHOP PROGRAM AREA

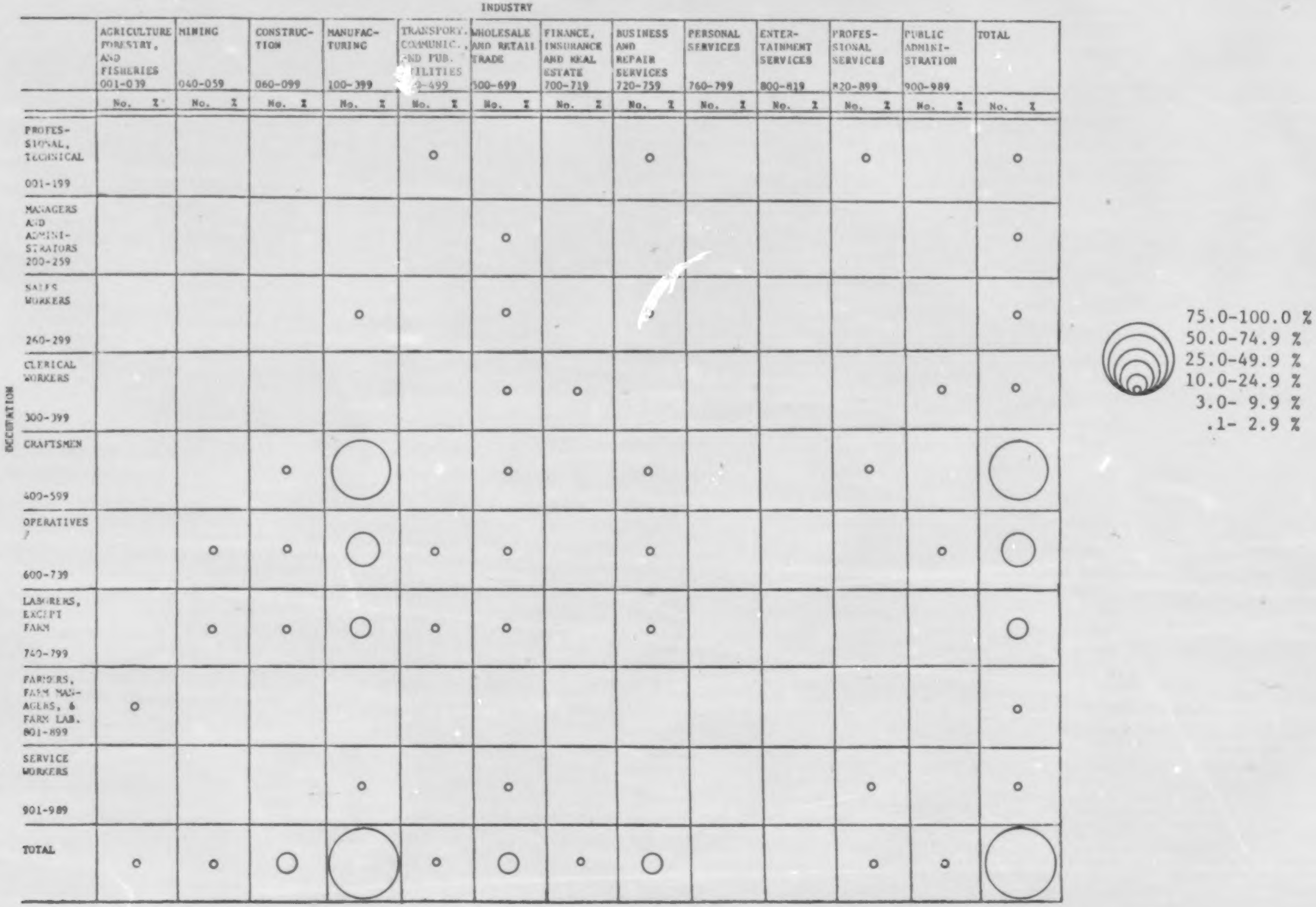
Craftsmen and operatives as major occupational groups accounted for nearly 82.0 percent of the jobs selected by graduates of the machine shop program (see Table 12). About 57 percent selected to become craftsmen and 24.6 percent became operatives. Eight percent of the graduates selected jobs as non-farm laborers. About 76 percent selected jobs in one major industry, manufacturing. Jobs in construction and the wholesale and retail trade were selected by 7.1 percent and 6.0 percent, respectively. One single cell in the occupation-industry matrix accounted for over half of the jobs selected by the sample of machine shop graduates, craftsmen in manufacturing with 51.8 percent. The only other cell of major importance was operatives in manufacturing with 19.4 percent. There was only one specific occupation and industry category selected by a significantly high proportion of graduates - 22.1 percent were employed as machinists working in non-electrical machinery industry (see Appendix IV).

PRACTICAL NURSING PROGRAM AREA

The practical nursing program area graduates have another unique job selection pattern (see Table 13). About 99 percent selected jobs as service workers. None of the other major occupational groups was selected by more than .5 percent of the sample graduates over the three year period. Ninety-eight (98) percent of the sample of graduates selected jobs in

TABLE 12

MAJOR OCCUPATIONS AND INDUSTRIES OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF THE GRADUATES OF THE MACHINE SHOP PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72



INDUSTRY

OCCUPATION

	AGRICULTURE FORESTRY, AND FISHERIES 001-039	MINING 040-059	CONSTRUCTION 060-099	MANUFACTURING 100-399	TRANSPORT., COMMUNIC., AND PUB. UTILITIES 400-499	WHOLESALE AND RETAIL TRADE 500-699	FINANCE, INSURANCE AND REAL ESTATE 700-719	BUSINESS AND REPAIR SERVICES 720-759	PERSONAL SERVICES 760-799	ENTERTAINMENT SERVICES 800-819	PROFESSIONAL SERVICES 820-899	PUBLIC ADMINISTRATION 900-989	TOTAL
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %
PROFESSIONAL, TECHNICAL 001-199					○			○			○		○
MANAGERS AND ADMINISTRATORS 200-259						○							○
SALES WORKERS 260-299				○		○		○					○
CLERICAL WORKERS 300-399						○	○					○	○
CRAFTSMEN 400-599			○	○		○		○			○		○
OPERATIVES 600-739		○	○	○	○	○		○				○	○
LABORERS, EXCEPT FARM 740-799		○	○	○	○	○		○					○
FARMERS, FARM MANAGERS, & FARM LAB. 801-899	○												○
SERVICE WORKERS 901-989				○		○					○		○
TOTAL	○	○	○	○	○	○	○	○			○	○	○

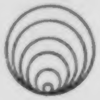
75.0-100.0 %
50.0-74.9 %
25.0-49.9 %
10.0-24.9 %
3.0- 9.9 %
.1- 2.9 %

TABLE 13

MAJOR OCCUPATIONS AND INDUSTRIES OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF THE GRADUATES OF THE PRACTICAL NURSING PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

INDUSTRY

OCCUPATION	AGRICULTURE FORESTRY, AND FISHERIES 001-039	MINING 040-059	CONSTRUCTION 060-099	MANUFACTURING 100-399	TRANSPORT. COMMUNIC., AND PUB. UTILITIES 400-499	WHOLESALE AND RETAIL TRADE 500-699	FINANCE, INSURANCE AND REAL ESTATE 700-719	BUSINESS AND REPAIR SERVICES 720-759	PERSONAL SERVICES 760-799	ENTERTAINMENT SERVICES 800-819	PROFESSIONAL SERVICES 820-899	PUBLIC ADMINISTRATION 900-989	TOTAL
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %
PROFESSIONAL, TECHNICAL 001-199													
MANAGERS AND ADMINISTRATORS 200-259						○							○
SALES WORKERS 260-299						○							○
CLERICAL WORKERS 300-399				○							○		○
CRAFTSMEN 400-599													
OPERATIVES 600-739						○							○
LABORERS, EXCEPT FARM 740-799													
FARMERS, FARM MANAGERS, & FARM LAB. 801-899													
SERVICE WORKERS 901-989						○			○		◯		◯
TOTAL				○		○			○		◯		◯



75.0-100.0 %
50.0-74.9 %
25.0-49.9 %
10.0-24.9 %
3.0- 9.9 %
.1- 2.9 %

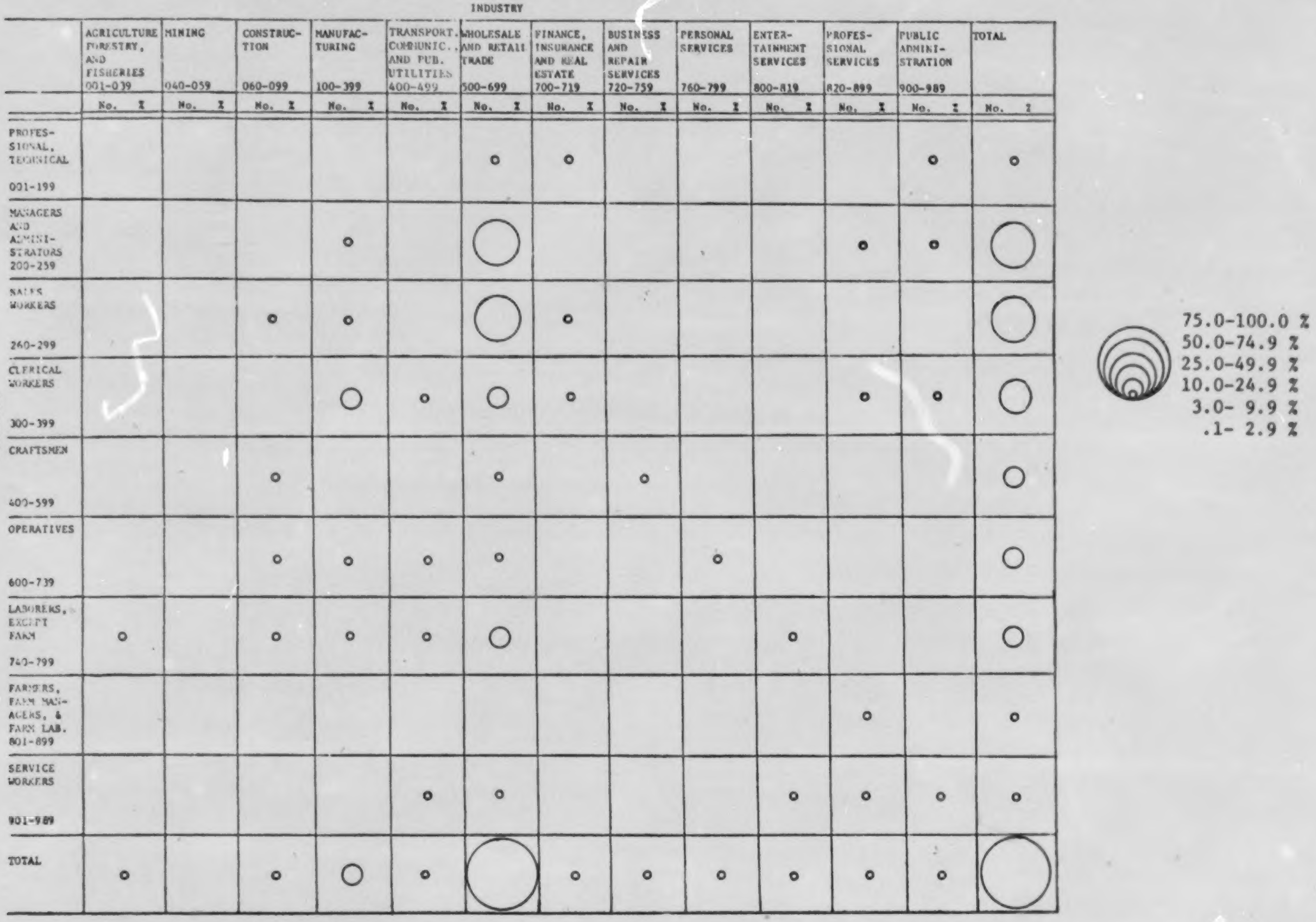
professional related services. No other major industry accounted for more than one percent of job selected by graduates. The largest single cell in the occupation industry matrix was service workers in the professional related services industry, with 97.7 percent. Of the 97.7 percent of the sample of graduates who selected jobs as practical nurses, there were three major specific industries in which they received employment. Hospitals accounted for the vast majority of the employment, with 79.4 percent. Convalescent institutions with 13.6 percent, and offices of physicians with 3.5 percent made up the next largest categories.

SALES AND BUSINESS MANAGEMENT PROGRAM AREA

The job selection patterns of the sales and business management and clerical program areas are a study in contrasts (see Table 14). One program, sales and business management, has over 75.0 percent of its graduates concentrated in jobs selected in one industry. The other program, clerical training, has over 75.0 percent of its graduates concentrated in jobs selected in one occupation. About 40 percent of the sample of graduates of the sales and business management program selected jobs as sales workers. About 27.1 percent became managers and administrators, 11.6 percent became clerical workers. The wholesale and retail trade accounted for the major industry group of 77.0 percent of the graduates. No other major industry accounted for the job selected by over 10.0 percent of the graduates. Two specific categories of occupation and industry with jobs selected by a relatively large number of graduates are: 6.8 percent for managers and administrators of department and mail order establishments. No other single job accounted for the employment of over ten graduates.

TABLE 14

MAJOR OCCUPATIONS AND INDUSTRIES OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE SALES AND BUSINESS MANAGEMENT PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72



INDUSTRY

OCCUPATION	AGRICULTURE FORESTRY, AND FISHERIES 001-039	MINING 040-059	CONSTRUCTION 060-099	MANUFACTURING 100-399	TRANSPORT. COMMUNIC., AND PUB. UTILITIES 400-499	WHOLESALE AND RETAIL TRADE 500-699	FINANCE, INSURANCE AND REAL ESTATE 700-719	BUSINESS AND REPAIR SERVICES 720-759	PERSONAL SERVICES 760-799	ENTERTAINMENT SERVICES 800-819	PROFESSIONAL SERVICES 820-899	PUBLIC ADMINISTRATION 900-989	TOTAL
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %
PROFESSIONAL, TECHNICAL 001-199						∘	∘					∘	∘
MANAGERS AND ADMINISTRATORS 200-259				∘		◯					∘	∘	◯
SALES WORKERS 260-299			∘	∘		◯	∘						◯
CLERICAL WORKERS 300-399				○	∘	○	∘				∘	∘	○
CRAFTSMEN 400-599			∘			∘		∘					○
OPERATIVES 600-739			∘	∘	∘	∘			∘				○
LABORERS, EXCEPT FARM 740-799	∘		∘	∘	∘	○				∘			○
FARMERS, FARM MANAGERS, & FARM LAB. 801-899											∘		∘
SERVICE WORKERS 901-989					∘	∘				∘	∘	∘	∘
TOTAL	∘		∘	○	∘	◯	∘	∘	∘	∘	∘	∘	◯

75.0-100.0 %
50.0-74.9 %
25.0-49.9 %
10.0-24.9 %
3.0- 9.9 %
.1- 2.9 %

SUMMARY

The job selection patterns of a sample of graduates from each of eight program areas in Minnesota's area vocational technical institutes show the diversity of the program's impact on the labor market. Job selection patterns were displayed in only two dimensions - occupation and industry of job selected. The job titles used are those of the employed graduates approximately one year after graduation over a three year period.

Each of the programs appeared to have a characteristic format to the job selection pattern of its graduates. Formats varied from concentration in one major occupational group across several different industries (clerical), concentration in one major industry group across several occupations (sales and business management), concentration in single occupation and industry groups (practical nursing), and diffusion across several occupations and industries (agri-technology). From the job selection patterns it is apparent that graduates from particular program areas in vocational-technical programs do not select one or two particular jobs (the closest to this situation in the program areas sampled is that of practical nursing). Rather, the jobs selected form a pattern covering several occupations and industries in varying intensities.

It is also evident that the job selection patterns overlap between program areas. For example, both the agri-technology and sales and business management program areas have a relatively large percentage of graduates who selected jobs as sales workers in the wholesale and retail trade industry.

STABILITY OF JOB AFTER ONE YEAR

The second question posed in this study was, "Do the graduates of specific vocational education program areas select the same kinds of jobs in relatively the same proportions from year to year?" In other words, "Are the job selection patterns stable over time?" The answer to this question is important when using manpower projection data in planning vocational education programs. If the job selection pattern for graduates of a specific program is known, this defines the interface between the vocational education program and the labor market. Even if graduates of a specific program select a wide variety of jobs (in terms of occupation and industry) the relationship as communicated via the job selection pattern is explicit and quantifiable. Definite planning of vocational programs can take place using manpower information. If, however, the job selection patterns for graduates of a specific vocational program area vary widely from year to year, and if this variation cannot be explained, the use of job selection patterns for long run planning of vocational education programs based on manpower information is much less valid.

In order to test whether or not job selection patterns are relatively stable over time, the job selection patterns for the vocational program areas selected in this study were compared from one year to the next. The data used in this study provided a job selection pattern for the graduates of eight purposefully selected program areas for three consecutive years.

Job selection patterns as described by major occupation and industry group of the job selected by graduates were compared using chi square analysis to see if the patterns were similar from one year to the next. The variations in more detailed occupation and industry groups is shown in Appendix IV.

Chi square analysis was used to test if the proportion of total graduates of a specific program area who selected a particular occupation/industry major group was significantly different from one year to another during the three year period. If job selections were stable, it was hypothesized that the proportion of total graduates selecting jobs characterized by a particular occupation/industry major group would be constant and equal for each year. Chi square analysis procedures can be used only when a minimum number of observations is available for each year. In order to meet this minimum only industry/occupation groups selected by at least 5 graduates from a given program area during each of the years were tested for stability. The data for major occupation/industry combinations for each program area meeting this criterion and the results of data analysis using the chi square statistic are shown in Table 15.

A total of 25 tests for differences in job selection patterns over the three year period were made. Using a significance level of .10, ten of the 25 combinations of occupations and industry were significantly different over the three year period for the eight program areas. There appears to be differences between program areas in the stability of selected dimensions (i.e., those occupations and industries selected by a relatively large number of graduates) of the job selection pattern of their graduates over time.

AGRI-TECHNOLOGY PROGRAM AREA

Two combinations of occupation and industry were tested for the agri-technology program area. In each of the tests, the percent of total graduates selecting a particular combination of occupation and industry was compared for the school years 1969-70, 1970-71, and 1971-72. For example, the first test shown in Table 15 was of the percent of graduates selecting a job in the sales workers occupational group in the wholesale and retail trade industry group. In this example, 13.6 percent of the graduates selected this major occupation/industry combination from the class of 1969-70, 14.0 percent from the 1970-71 class, and 21.7 percent from the 1971-72 class. This variation in percentages over the three years was not significant at the .10 level when using chi square analysis. The variation in percentages was also not significant for the major occupational group of farmers, farm managers, and farm laborers in the agriculture, forestry, and fisheries major industry group.

Although, in both cases there were changes in percentages over the three year period, neither was statistically significantly different. The two combinations of major occupation/industry group account for approximately 34 percent of the jobs selected by the graduates of the agri-technology program area. It was not possible to test more combinations because the agri-technology program graduates are relatively spread out across both occupations and industries and, therefore, the percentage in

TABLE 15

RESULTS OF CHI SQUARE ANALYSIS OF STABILITY OF JOB SELECTION PATTERNS IN TERMS OF MAJOR OCCUPATION AND INDUSTRY GROUP OF SAMPLE OF GRADUATES OF MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Program	Major Occupation/Industry Group	Percent Selecting Job 1969-1970	1970-1971	1971-1972	Significant Difference[a]
Agri-Technology	Sales Workers/Wholesale and Retail Trade	13.6	14.0	21.7	No
	Farmers, Farm Managers, Farm Laborers/Agriculture, Forestry Fisheries	18.2	20.2	13.0	No
Automotive	Craftsmen/Wholesale and Retail Trade	47.0	33.0	31.7	Yes
	Craftsmen/Business and Repair Service	18.1	35.1	26.9	Yes
	Operatives/Wholesale and Retail Trade	3.6	8.5	4.8	No
Chefs, Cooks, and Food Preparation	Managers and Administrators/ Wholesale and Retail Trade	11.6	7.4	4.9	No
	Service Workers/Wholesale and Retail Trade	12.8	35.3	44.4	Yes
	Service Workers/Personal Services	15.4	16.2	22.2	No
	Service Workers/Professional Services	24.4	4.4	8.6	Yes
Clerical	Clerical Workers/Manufacturing	8.1	15.9	22.1	Yes
	Clerical Workers/Wholesale and Retail Trade	10.1	6.8	6.7	No
	Clerical Workers/Finance, Insurance and Retail Trade	19.2	14.8	13.5	No
	Clerical Workers/Business and Repair Services	7.1	5.7	3.8	No

Table 15 continued

Program	Major Occupation/Industry Group	Percent Selecting Job 1969-1970	1970-1971	1971-1972	Significant Difference
Clerical (continued)	Clerical Workers/Professional Services	27.2	19.3	15.4	No
	Clerical Workers/Public Administration	6.1	5.7	10.6	No
Electronics	Professional, Technical/Manufacturing	14.8	12.2	14.7	No
	Professional, Technical/Business and Repair Service				
	Craftsmen/Transportation, Communication and Public Utilities	21.0	10.0	7.8	Yes
	Craftsmen/Wholesale and Retail Trade	12.3	6.7	10.8	No
	Operatives/Manufacturing	8.6	10.0	6.9	No
Machine Shop	Craftsmen/Manufacturing	1.4	41.1	64.9	Yes
	Operatives/Manufacturing	21.7	21.1	16.0	No
Practical Nursing	Service Workers/Professional Services	99.2	99.2	94.0	No[b]
Sales and Business Management	Managers and Administrators/Wholesale and Retail Trade	2.1	22.8	30.4	Yes
	Sales Workers/Wholesale and Retail Trade	31.2	45.5	29.4	Yes

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[a] Significant at 10 percent level.

[b] The high percentage of graduates in the 1969-70 and 1970-71 makes chi square analysis infeasible but it is obvious from examination of the percentages that the difference is not significant.

most combinations of occupation and industry was too small to meet the criteria for chi square analysis; also, the agri-technology program area had the fewest number of graduates of all the program areas selected for this study. Based on the analyses that were conducted, it appears that the agri-technology program area graduates are fairly stable in the jobs selected. Future studies should include more graduates so that a more complete analysis in terms of occupations and industries can be conducted.

AUTOMOTIVE PROGRAM AREA

Three comparisons were possible for the automotive program area graduates; two showed significant differences over the three years in percent choosing selected occupation/industry major groups. The two occupation/industry combinations showing significant differences were craftsmen in the wholesale and retail trade industry and craftsmen in the business and repair service industry. For the first, the percentage decreased substantially between 1969-70 and 1970-71 and then remained fairly stable. In the second comparison, the percentage increased between 1969-70 and 1970-71 and then decreased between 1970-71 and 1971-72. The comparison for graduates selecting jobs as operative in the wholesale and retail trade industry was relatively stable; there were much fewer graduates selecting jobs in this occupation/industry combination.

In total, occupation/industry combinations examined accounted for approximately 68 percent of the job selected by graduates of the automotive program area. From this analysis, it appears that there were some major shifts over the years examined in job selection patterns for the major occupation/industry combinations selected by the largest number of graduates.

CHEFS, COOKS, AND FOOD PREPARATION PROGRAM AREA

Four comparisons were made within the occupation/industry combinations in the job selection patterns of the graduates of the chefs, cooks, and food preparation program area. Two showed significant differences in percentages choosing a selected combination of occupation and industry over the three years and two did not. Those showing differences were service workers in the wholesale and retail trade and service workers in professional service industries. In the first, there was a substantial increase in percentage selecting the combination; starting with a 12.8 percent of the graduates selecting jobs in this combination in 1969-70 and ending 44.4 percent of the graduates in 1971-72. The second combination showing a significant difference displayed a major decrease in percentages between 1969-70 and 1970-71, followed by a more stable period. The two occupation/industry combinations which did not show a statistical difference were managers and administrators in the wholesale and retail trade industry and service workers in the personal services industry.

Together the four occupation/industry combinations analysed accounted for about 70 percent of the jobs selected by graduates of the chefs, cooks, and food preparation program area. The analysis showed major shifts in job selection patterns over the three years for two major occupation/industry group combinations which contained from 37.2 percent to 53.0 percent of the jobs selected by graduates over the three year period examined. Conversely, two other major occupation/industry group combinations were relatively stable in percentages of graduates selecting jobs within them. These findings imply that job selection patterns may have relatively stable and unstable elements within them.

CLERICAL PROGRAM AREA

Six comparisons were possible for the combinations of major occupation/industry group of jobs selected by graduates of the clerical program area. In all but one case, there were no statistically significant differences in percentages of graduates choosing jobs in selected combinations. The combination showing a significant difference was for clerical workers in the manufacturing industry; here there was a continued increase in percentages over the three year period.

The combinations of industry and occupation analysed contain about 72 percent of jobs selected by graduates from the clerical program area. From the analyses, it appears that the job selection pattern for these graduates is fairly stable except for one major occupation/industry combination.

ELECTRONICS PROGRAM AREA

For the electronics program area, five combinations of occupation and industry were tested. Two of the combinations had a significant difference in percentage of graduates over the three year period. In the case of of professional and technical occupations in the business and repair service industry, the percentage of graduates selecting a job of this kind was increasing. Conversely, with those selecting jobs in craftsmen occupations in the transportation, communications, and public utilities industry, the percentages were decreasing. In the other three occupation/industry combinations the differences in percentages were not significant over the three years.

Together these five combinations of occupation and industry accounted for about 55 percent of the jobs selected by graduates. As with the chefs, cooks, and food preparation program, it appears that the job selection pattern for graduates of the electronics program area has both stable and unstable elements.

MACHINE SHOP PROGRAM AREA

Two combinations of occupation and industry were analysed for graduates of the machine shop program area. One did not have significant differences in percentage of graduates over the three year period while the other, craftsmen in the manufacturing, had major differences over the years studies. The latter combination increased from 1.4 percent for 1969-70 school year graduates to 64.9 percent for the 1971-72 graduates. For the 1971-72 graduates, these two combinations accounted for about 80 percent of the jobs selected by graduates. From the analysis, it is apparent that the job selection pattern was undergoing a significant change in at least one major occupation/industry group combination. Since the percentage in one combination cannot change so drastically without affecting other combinations, it seems the job selection pattern for graduates of the machine shop program area was fairly unstable.

PRACTICAL NURSING PROGRAM AREA

The nursing area is unique in that more than 90 percent of the graduates selected jobs in the service worker major occupational group in the professional services major industry group for each of the three years studied. The difference in percentage of graduates between years was not significant for this combination of occupation and industry. The graduates of the practical nursing program area had the most stable job selection pattern of all program areas examined.

SALES AND BUSINESS MANAGEMENT PROGRAM AREA

Two combinations of major occupation and industry groups were examined for graduates of the sales and business management program area; both had significant differences in percentages of graduates over the three year period. In the case of managers and administrators in wholesale and retail trade, the change was a substantial increase over the three years, particularly between 1969-70 and 1970-71. For those selecting jobs as sales workers in wholesale and retail trade, there was an increase and then decrease over the time periods.

The two combinations examined accounted for about 60 percent of the jobs selected by graduates of the sales and business management program area. From the assessment, it appears that graduates of this program area have a relatively unstable job selection pattern.

SUMMARY

The job selection patterns identified in the previous section of the report were examined in terms of their stability for graduates over three school years, 1969-70 to 1971-72. Stability of job selection patterns was assessed by comparing the percentage of graduates from a given program area who selected a job in several combinations of major occupation and industry groups for each of three years. Chi square analysis was used to test for significant differences over the three year period; only combinations of occupation and industry with a sufficient number of graduates from a program area were tested.

The analysis indicated the following: (1) program areas vary from very stable to unstable in the job selection patterns of their graduates, (2) some program areas have both stable and unstable combinations of occupation and industry within the job selection patterns of their graduates, and (3) where job selection patterns, or portions thereof, are unstable all four possible trends were evident (i.e., increase-increase, decrease-decrease, increase-decrease, decrease-increase).

The total percentage of graduates covered in the tested combinations of occupation and industry for the program areas varied from about 34 percent for agri-technology to 97 percent for practical nursing; most were in the 70 percent range. Although this meant that for most program areas (with the exception of agri-technology) a majority of the graduates were included in the aspects of the job selection pattern examined, a more comprehensive and inclusive means must be developed to measure stability of job selection patterns. A more inclusive measure would allow comparison between program areas and more internal analysis between years for a selected program area to determine: (1) if the occupation and industry combinations are stable in terms of those included and excluded from the pattern, (2) if there are instabilities in pattern, what is the total effect on the pattern (not just for combinations selected by largest number of graduates), and (3) if it is warranted to examine specific occupations and industries within the major occupation and industry groups.

GEOGRAPHIC LOCATION OF JOB AFTER ONE YEAR

The third question posed in this study was, "What is the pattern of geographic location of 'jobs after one year' selected by graduates?" As stated earlier, geographic location of a job is an important dimension of labor market information -- jobs exist in particular geographic areas and not in others. Vocational education programs can be and are located in various parts of the State. Documenting the interface between vocational education programs and the labor market, for use in planning vocational education is, therefore, enhanced by including the geographic location of jobs selected by program graduates in the concept of "job selection pattern".

Data on geographic location of jobs selected by graduates of each program over the three-year period 1969-70 to 1971-72 was summarized for each county and economic region in Minnesota and for other states. Patterns of geographic location by economic regions in Minnesota were constructed for each program area over the three year period. The patterns are displayed in Figures 4 to 11. The patterns were based on the percent of graduates of a given program area during the three year period whose "job after one year" was in each economic region in Minnesota, neighboring states, and other states. As with the previous tables showing the job selection pattern in terms of industry and occupation, various size circles are used to represent the percentage of total graduates who selected jobs in each of the designated geographic areas. Again the attempt is to create a visual "pattern" of the geographic location dimension of the job selection pattern.

In this section, the patterns of geographic location of jobs selected by graduates is analysed separately from the dimensions of occupation and industry of the jobs (analysed in the previous section). In practice, these three dimensions could be combined to show a more complete job selection pattern and thereby a more complete documentation of interface between vocational education programs and the labor market.

Each of the eight vocational programs examined placed graduates from the sample in at least 40 of Minnesota's 87 counties. The automotive program distributed graduates the most widely, with 73 counties represented. Next was the clerical training program with graduates receiving employment in 63 counties. The detailed geographic distribution of jobs selected by graduates for each economic region is shown in Appendix V.

AGRI-TECHNOLOGY PROGRAM AREA

The western and southern agricultural areas of the state dominated the employment of the agri-technology graduates (see Figure 4). Region Six, centered in Willmar, dominated this program with 23.6 percent of the graduates. Willmar is one of the leading food processing centers in Minnesota. Region Ten, with 12.7 percent, is also the home of a leading food processing center, Austin. Regions Four and Eight were also important employers of agri-technology graduates with 11.8 percent and 12.6 percent, respectively. Regions Seven and Nine each employed about 5.0 percent and 8.4 percent, representively, of the agri-technology graduates. This is the only one of the eight selected programs where Region Eleven, Minneapolis-St. Paul, does not dominate. Seven and five-tenths (7.5) percent were employed in the Twin Cities area.

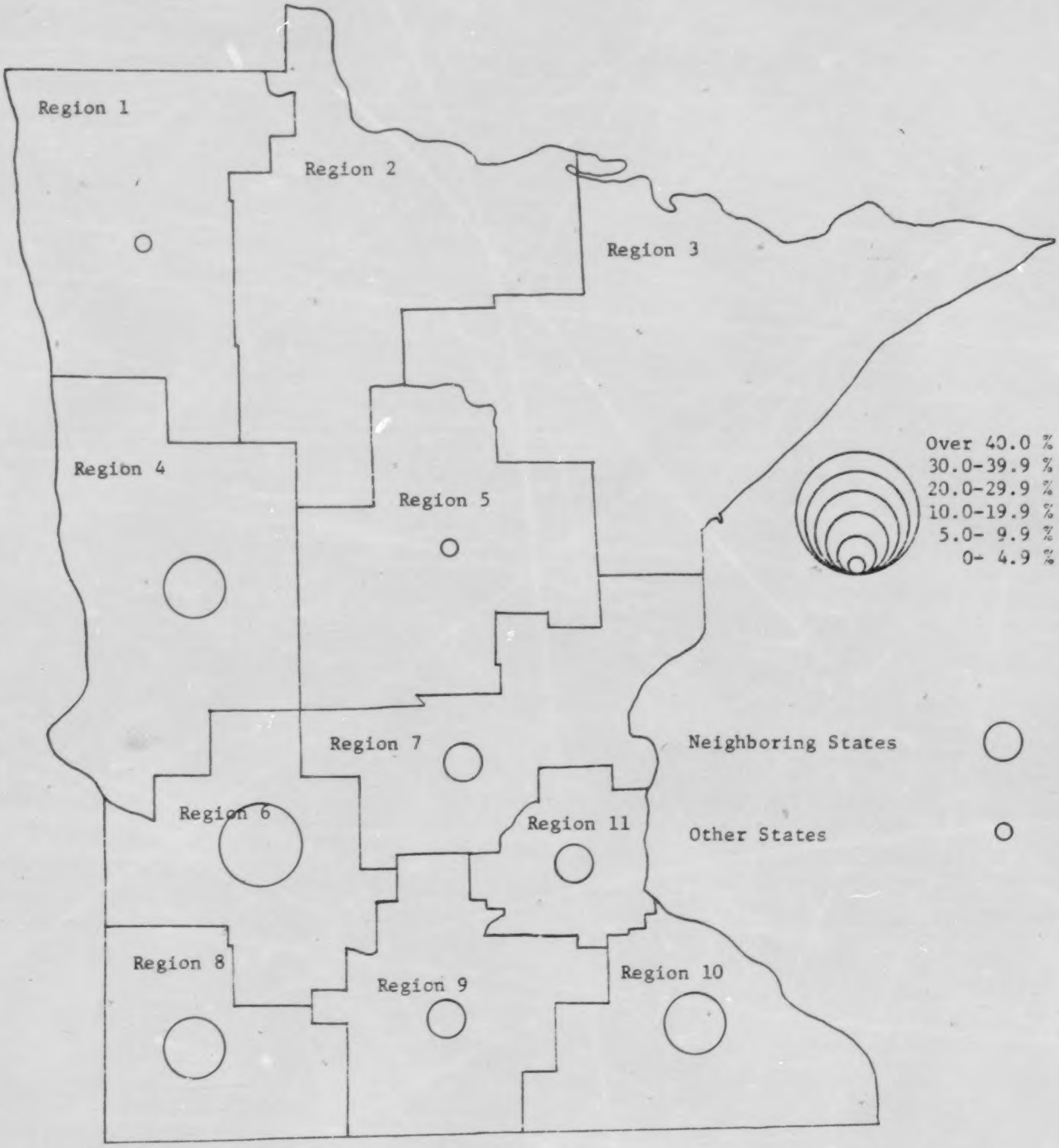

Region 1
Region 2
Region 3
Region 4
Region 5
Region 6
Region 7
Region 8
Region 9
Region 10
Region 11
Over 40.0 %
30.0-39.9 %
20.0-29.9 %
10.0-19.9 %
5.0- 9.9 %
0- 4.9 %
Neighboring States
Other States

FIGURE 4. GEOGRAPHIC LOCATION OF JOBS HELD ONE YEAR BY SAMPLE OF GRADUATES OF THE AGRI-TECHNOLOGY PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

AUTOMOTIVE PROGRAM AREA

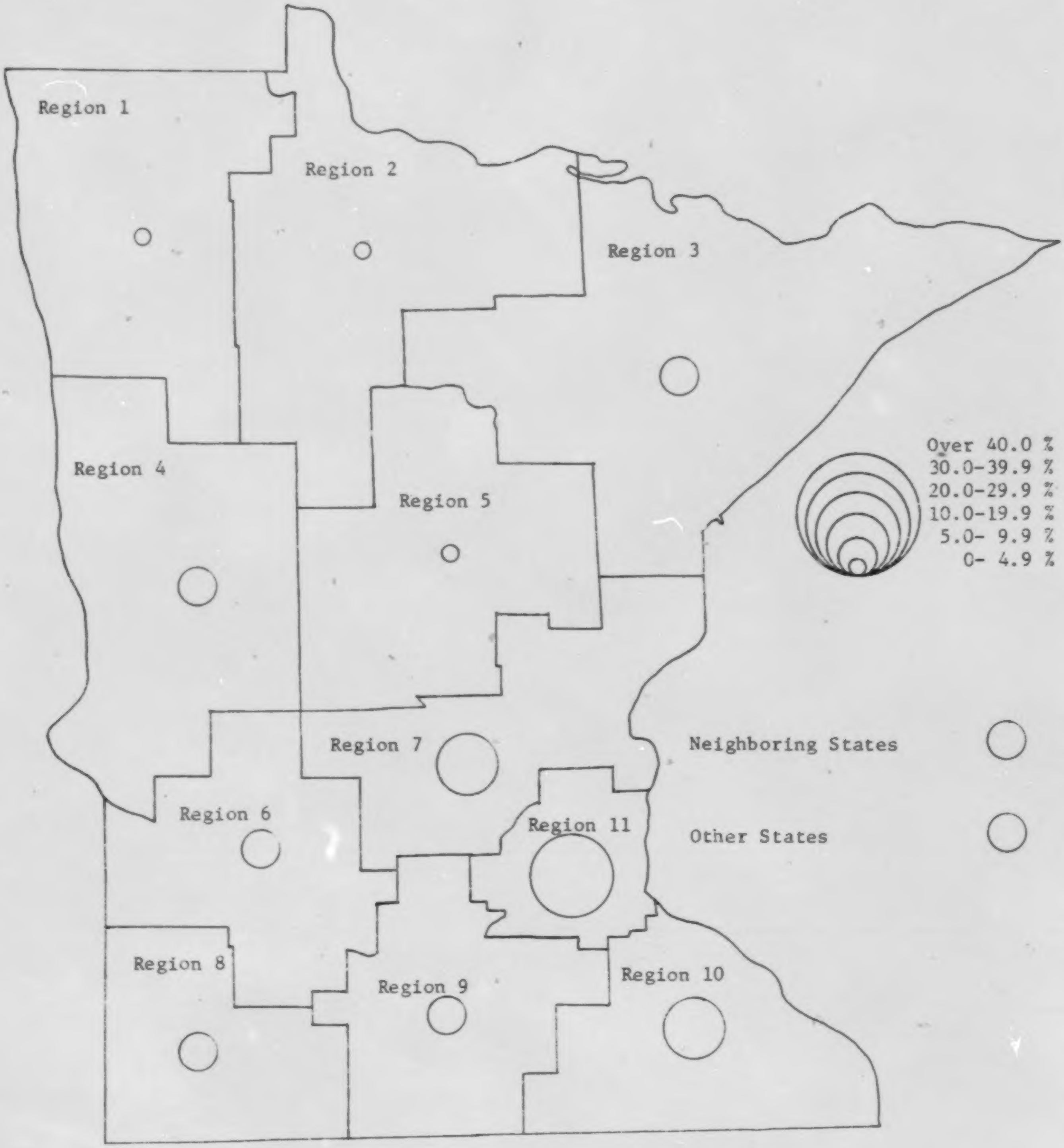
The sample of Minnesota Area Vocational-Technical Institute graduates of the automotive program primarily became employed by automobile dealership and automobile repair garages. Jobs of this kind are most predominant in the regions with the largest and fastest growing populations. Regions Eleven, Seven, and Ten fit these two criteria. They account for two-thirds of the population of the state (see Figure 5). Twenty-three and one-tenth (23.1) percent of the sample of automotive graduates became employed in Region Eleven, the Twin Cities area. Eleven and four-tenths (11.4) percent obtained employment in Region Seven, primarily St. Cloud. Region Ten, Rochester, Owatonna, Red Wing, Winona, Albert Lea, and Austin, accounted for 13.2 percent. The other regions, except Regions One, Two, and Five, each had from 5.0 - 9.9 percent of the graduates of the automotive program employed.

CHEFS, COOKS, AND FOOD PREPARATION PROGRAM AREA

Restaurants and hotel restaurants accounted for most of the employment of graduates of the chefs, cooks, and food preparation program. The Twin City area employed the highest percentage of these graduates, with 40.0 percent (see Figure 6). Another region with a large population, Region Three, including Duluth, employed 11.0 percent.

CLERICAL PROGRAM AREA

High concentration of clerical employment are usually located in the central business districts of major metropolitan areas and in surrounding suburbs. Economic Region Eleven has two central business areas, Minneapolis and St. Paul, and several suburban office complexes: Normandale - Interstate 494 in Edina and Bloomington, Wayzata Boulevard - Highway 18 is St. Louis Park, Golden Valley and Minnetonka, Highway 100 - Interstate 94 in


Region 1
Region 2
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Region 5
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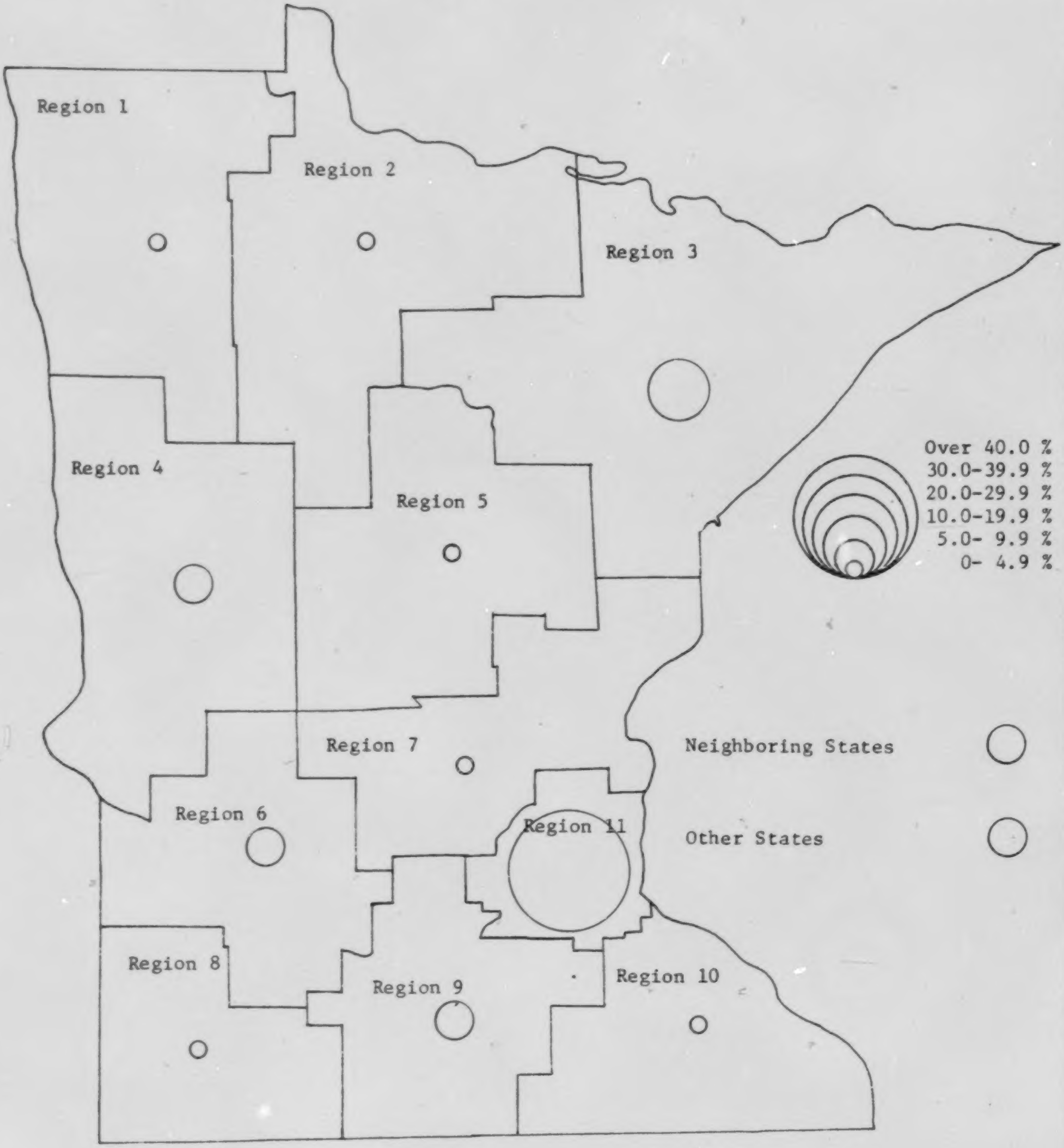
Region 7
Region 8
Region 9
Region 10
Region 11
Over 40.0 %
30.0-39.9 %
20.0-29.9 %
10.0-19.9 %
5.0- 9.9 %
0- 4.9 %
Neighboring States
Other States

FIGURE 5. GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE AUTOMOTIVE PROGRAM IN MINNESOTA AREA VOCATIONAL-TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72


Region 1
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Region 11
Over 40.0 %
30.0-39.9 %
20.0-29.9 %
10.0-19.9 %
5.0- 9.9 %
0- 4.9 %
Neighboring States
Other States

FIGURE 6. GEOGRAPHIC LOCATIONOF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE CHEFS, COOKS, AND FOOD PREPARATION PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72.

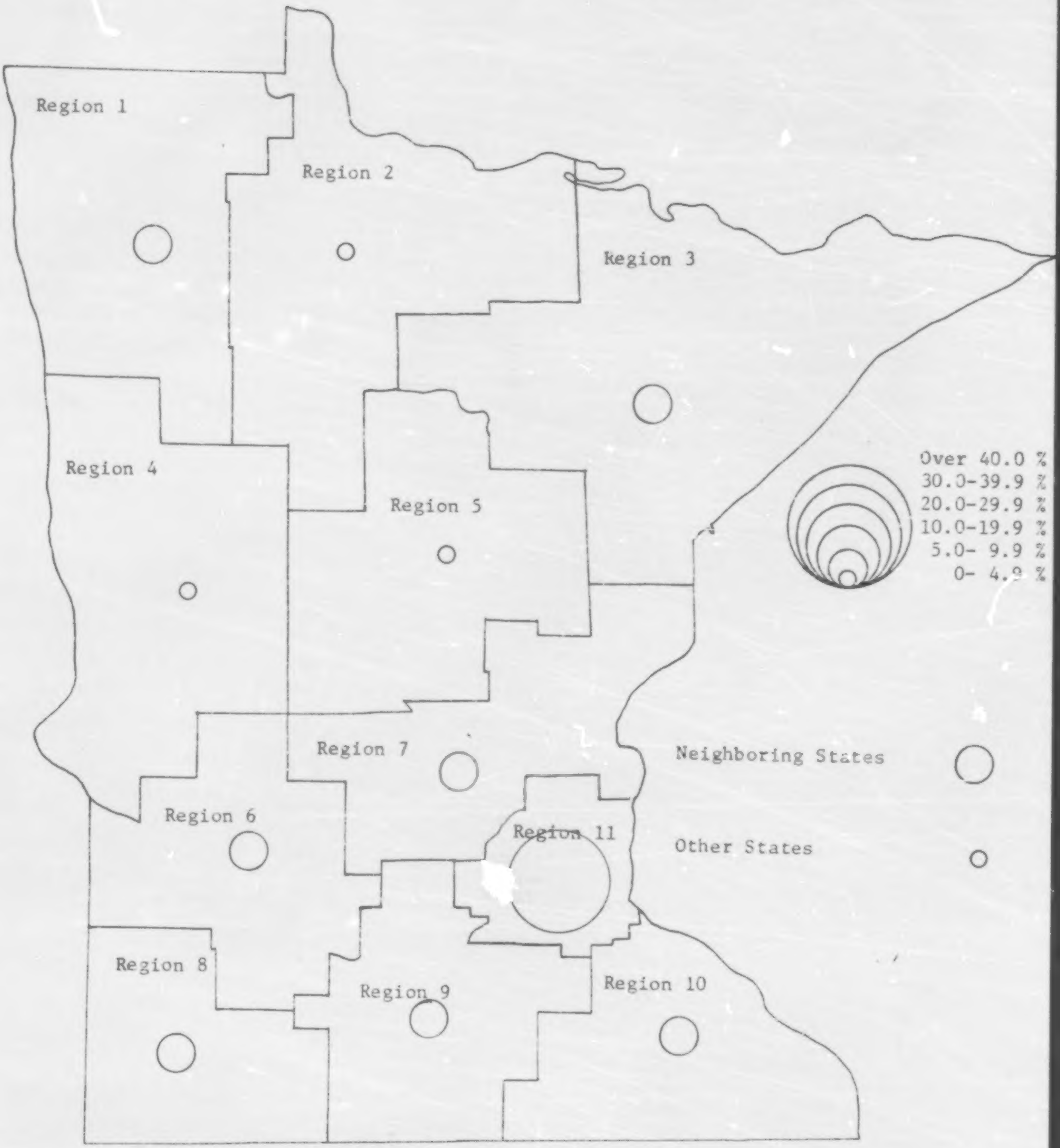
Brooklyn Center, and Hudson Road - Highway 110 in Maplewood and Oakdale. Economic Region Eleven accounted for the employment of 30.6 percent of the sample of graduates of the clerical training program (see Figure 7). No other region in the state employed more than 9.0 percent of the graduates. An interesting anomoly was Region One. This is the second smallest region in the state, and has no city with a population of over 9,000. Yet, with only about two percent of the state's population, it employed 5.1 percent of the clerical training graduates.

ELECTRONICS PROGRAM AREA

Generally, employment in the electronics field was concentrated in metropolitan areas and cities in the 15,000 to 60,000 range. Over 78 percent of the sample of electronics graduates employed in Minnesota were concentrated in the five regions with centers of over 30,000 population (see Figure 8). The Minneapolis-St. Paul area is one of the leading electronics centers in the United States, specializing in computer manufacturing, software services, and electronics machinery manufacturing. Of the sample of electronics graduates, 42.9 percent obtained employment in the Twin Cities area. Region Nine, centering in Mankato, accounted for the next largest percentage of electronics graduates employed, with 12.8 percent. Regions Three, Seven, and Ten each accounted for 5.0 - 9.9 percent of electronics graduates employed. Region Three, centering in Duluth and the Iron Range, attracted 7.7 percent. Region Seven, predominately St. Cloud, attracted 6.2 percent. Region Ten, centering in Rochester, but with other electronics employment in Albert Lea, Owatonna, and Winona, attracted 9.5 percent.

MACHINE SHOP PROGRAM AREA

The machine shop program graduates employed centered in the central part of the state (see Figure 9). Regions Eleven, with 45.5 percent,


Region 1
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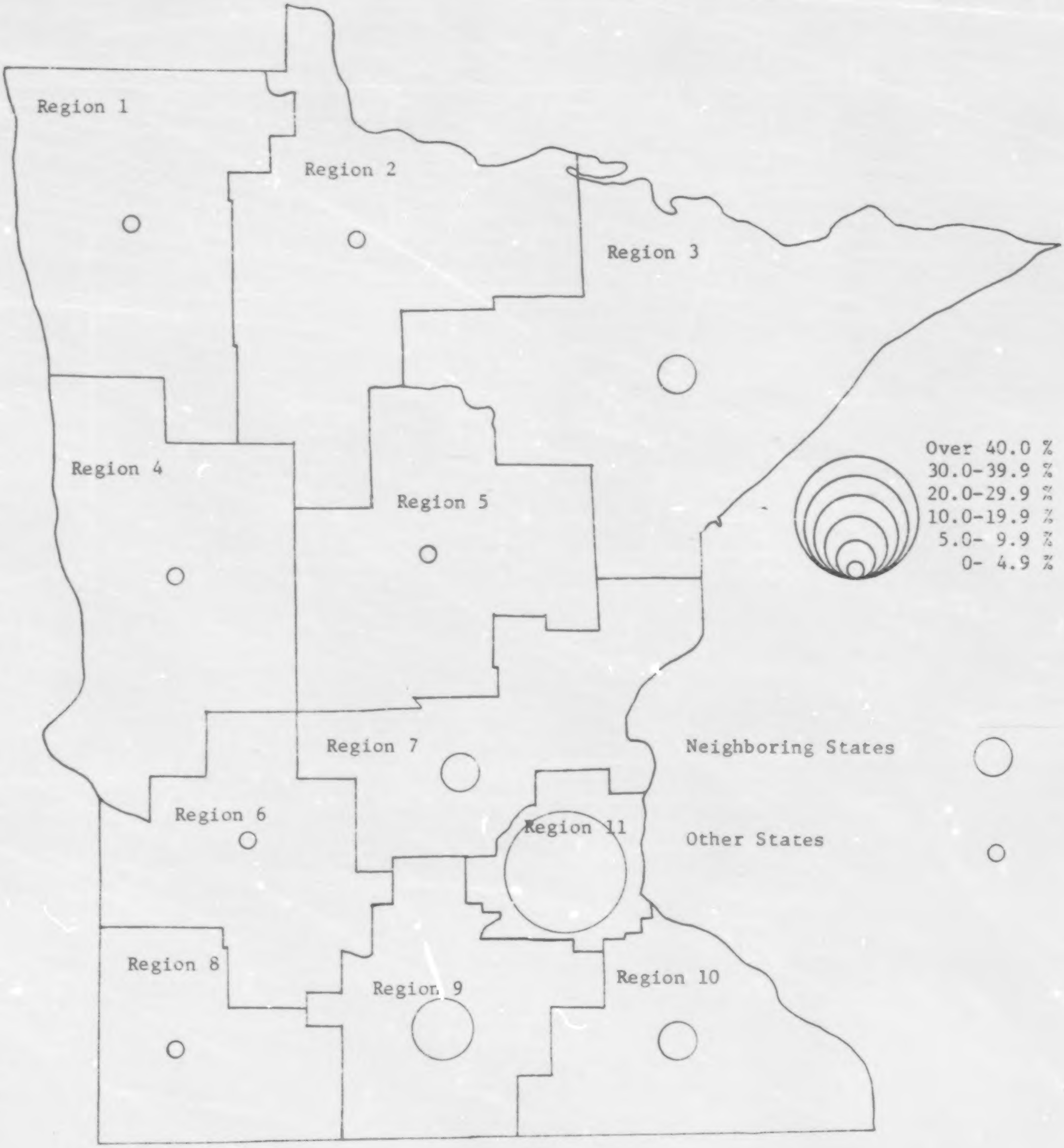
Region 8
Region 9
Region 10
Region 11
Over 40.0 %
30.0-39.9 %
20.0-29.9 %
10.0-19.9 %
5.0- 9.9 %
0- 4.9 %
Neighboring States
Other States

FIGURE 7. GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE CLERICAL TRAINING PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72


Region 1
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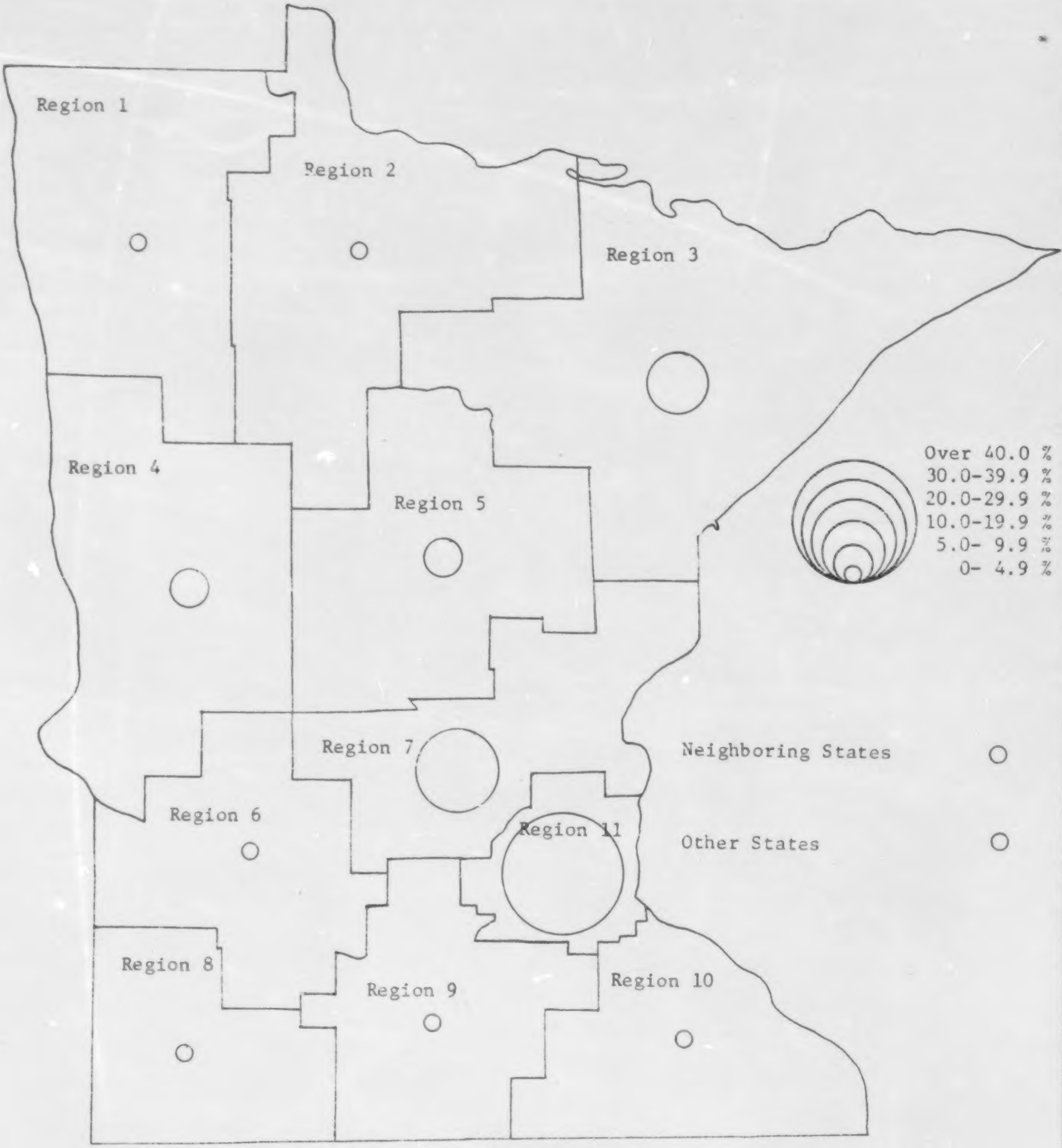
Region 4
Region 5
Region 6
Region 7
Region 8
Region 9
Region 10
Region 11
Neighboring States
Other States
Over 40.0 %
30.0-39.9 %
20.0-29.9 %
10.0-19.9 %
5.0- 9.9 %
0- 4.9 %

FIGURE 8. GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE ELECTRONICS PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72.


Region 1
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Region 8
Region 9
Region 10
Region 11
Over 40.0 %
30.0-39.9 %
20.0-29.9 %
10.0-19.9 %
5.0- 9.9 %
0- 4.9 %
Neighboring States
Other States

FIGURE 9. GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE MACHINE SHOP PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72.

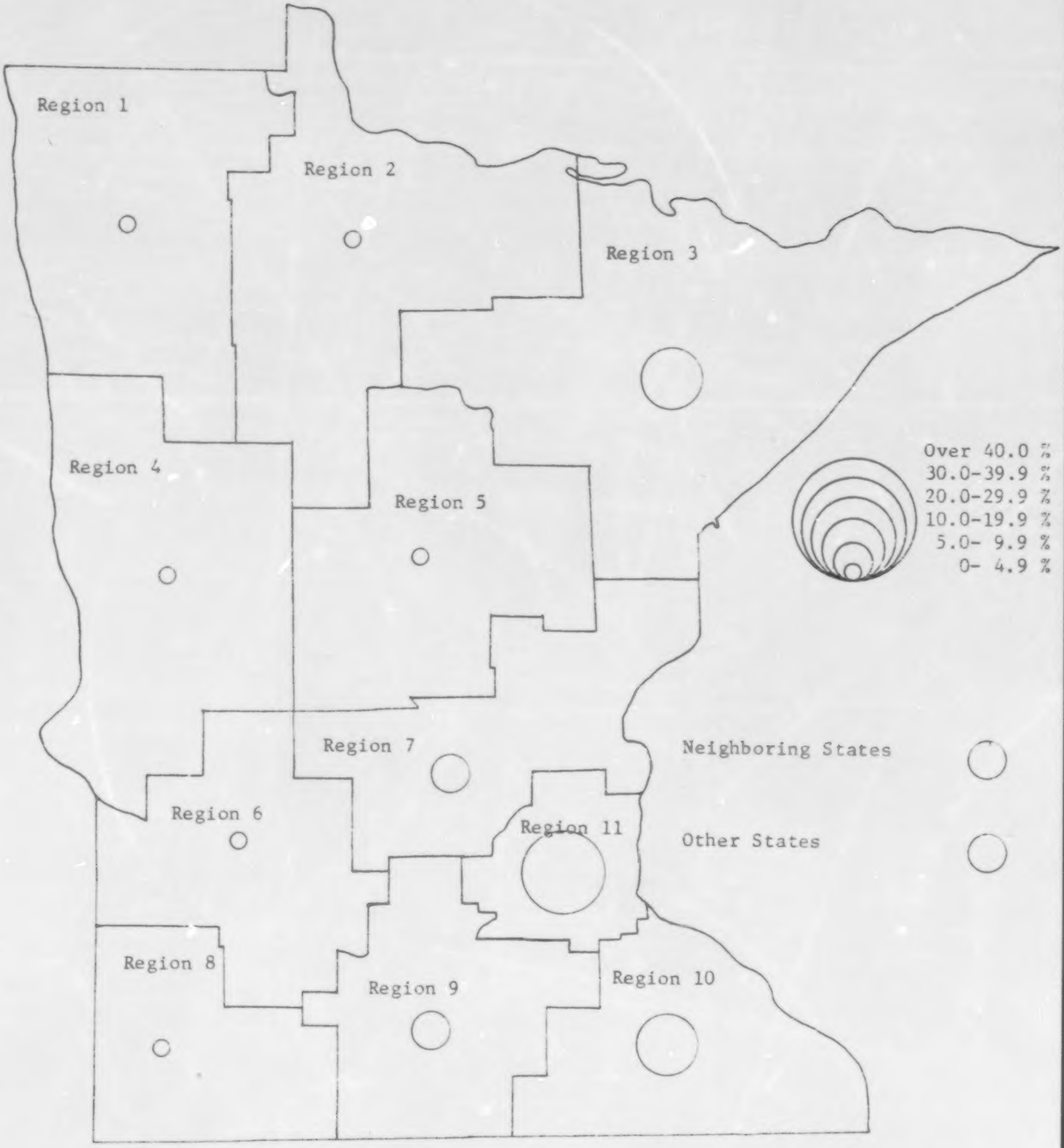
and Seven, with 11.1 percent, accounted for about three-fifths of the graduates employed. Much of the machinery manufactured in the Minneapolis-St. Paul and St. Cloud areas is electronic machinery and agriculture-related machinery. Region Three, Duluth and the Iron Range, had 11.5 percent employed. Two central Minnesota regions, Four and Five, accounted for 5.1 percent and 5.5 percent, respectively. Regions Six, Eight, Nine, and Ten together accounted for only 15.2 percent of the machine shop employment for the sample of graduates in Minnesota.

PRACTICAL NURSING PROGRAM AREA

Minnesota is one of the nation's leading states in health care. Practical nursing employment was centered in the largest cities in Minnesota. Eighty percent of the sample of practical nursing graduates obtained employment in the four eastern regions and the south central region (see Figure 10). Region Eleven, the Twin Cities area, accounted for 35.3 percent of the sample of practical nursing graduates employed. Twelve and eight-tenths (12.8) percent of the practical nursing graduates obtained employment in Region Three, primarily Duluth. Region Ten includes Rochester, the home of the Mayo Clinic and its related hospitals and health facilities. Fourteen and eight-tenths (14.8) percent of the sample of practical nursing graduates obtained employment in Rochester and Region Ten's other cities. Regions Seven, centering in St. Cloud and Nine, centering in Mankato, accounted for 9.5 percent and 7.3 percent, respectively, of practical nursing graduate employment.

SALES AND BUSINESS MANAGEMENT PROGRAM AREA

The sales and business management programs graduates primarily received employment in the four largest urban areas in Minnesota (see Figure 11). Region Eleven, the Twin Cities area, employed 21.7 percent. Region Three,


Region 1
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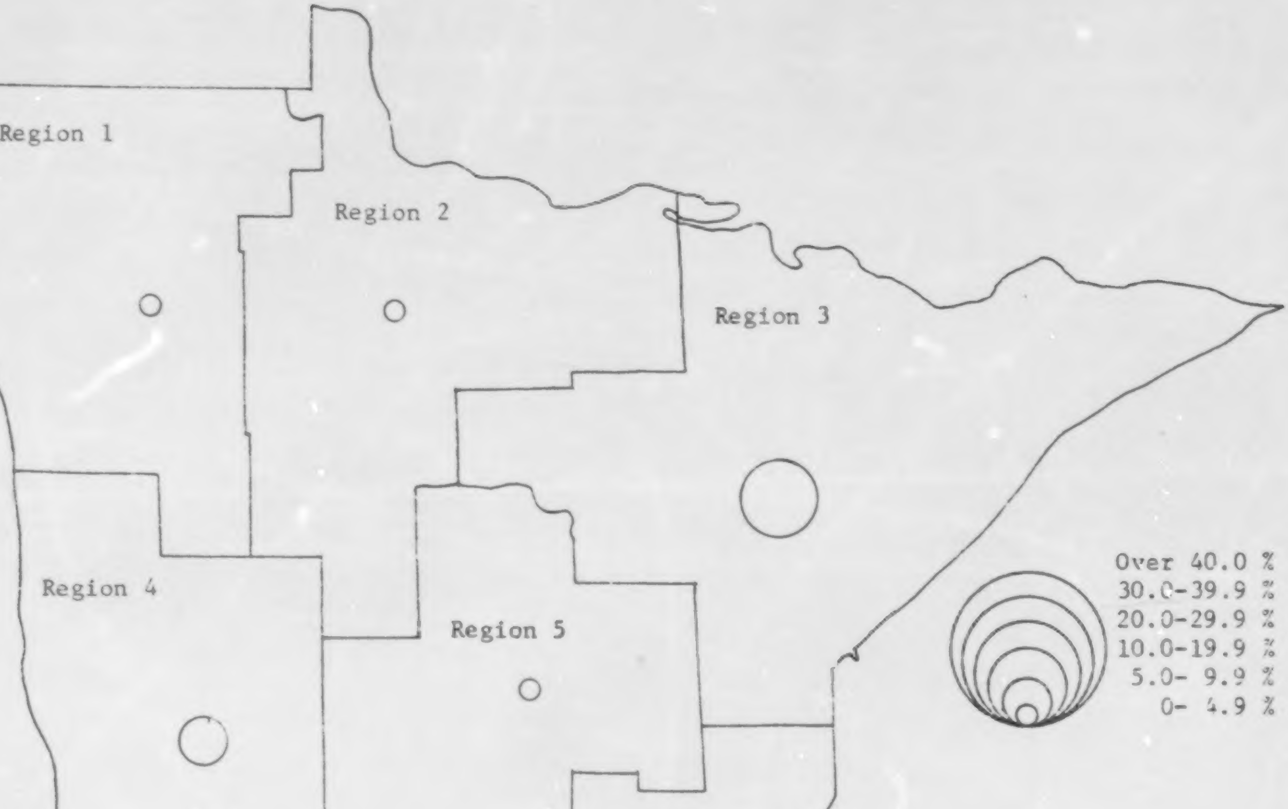
Region 11
Over 40.0 %
30.0-39.9 %
20.0-29.9 %
10.0-19.9 %
5.0- 9.9 %
0- 4.9 %
Neighboring States
Other States

FIGURE 10. GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE PRACTIAL NURSING PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSITUTUES, SCHOOL YEARS 1969-70 TO 1971-72.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Region 11
Over 40.0 %
30.0-39.9 %
20.0-29.9 %
10.0-19.9 %
5.0- 9.9 %
0- 4.9 %
Neighboring States
Other States

FIGURE 11. GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE SALES AND BUSINESS MANAGEMENT PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72.

primarily Duluth, employed 11.2 percent. Region Seven, centered in St. Cloud, employed 10.0 percent. Region Ten, Rochester, Owatonna, Winona, Albert Lea, and Austin, employed 11.9 percent. Three other regions, each with a city of at least 12,000, employed between 5.0 percent and 9.9 percent. Region Four, primarily Moorhead and Fergus Falls, employed 9.2 percent. Region Six, primarily Willmar, employed 7.6 percent. Region Nine, centered in Mankato, employed 7.6 percent.

SUMMARY

The geographic location of jobs selected by graduates of vocational education programs was used as another dimension, along with occupation and industry, to characterize job selection patterns. For each of the eight vocational education program areas, the pattern of geographic location of selected jobs was described by economic regions in Minnesota. There was substantial variation in geographic location patterns between programs (e.g., agri-technology versus chefs, cooks, and food preparation). In terms of similarity, all program area graduates (except agri-technology) selected jobs located in Economic Region Eleven more than in any other economic region.

STABILITY OF GEOGRAPHIC LOCATION OF JOB AFTER ONE YEAR

The fourth question posed in this study was, "Is the pattern of geographic location of 'job after one year' selected by graduates of a sample of programs in Minnesota's area vocational technical institutes stable over a three year period?" Stability of patterns would mean that graduates of a program area select jobs in a given geographic location in the same proportions from year to year. In this section of the study, the geographic location was taken to consist of the economic regions in Minnesota and other states taken as a whole. Economic regions were chosen because one of the criteria used in their designation was the boundaries of labor market areas. Therefore, it might be assumed that there would be less mobility of labor force participants between economic regions than within them (i.e., people tend to stay within labor market areas). In the previous section, the geographic location dimension of the job selection pattern of graduates of the sample program areas was displayed. These patterns showed the geographic impact of the selected program areas in the State.

Before these patterns are used in comparing the planned output of vocational education programs and the geographic location of projected labor market demand, some assessment must be made of the stability of the patterns over time. Using the data available for each of the school years 1969-70, 1970-71, and 1971-72 for the program areas selected in this study, an analysis was made of the change in geographic location of the job that graduates held approximately one year after leaving school. As in the analysis of stability of job selection patterns in terms of occupation and industry the chi square statistics was used to compare the proportions of graduates from a selected program area who were working at jobs in each economic region in Minnesota and other states for each of the three years. Because of limitation of the chi square statistic, the patterns were analysed for only those economic regions which had at least five graduates for each of the selected years. The proportions which were compared are shown as percentages in Table 16. The percentage of graduates selecting jobs in each economic region in Minnesota and other states for each sample program area is presented in Appendix V.

The results of chi square analysis show no statistically significant changes in proportions of graduates in analysed economic regions and other states for the program areas of agri-technology, automotive, electronics, and machine shop. For these program areas, the geographic location dimension of job selection patterns was concluded to be relatively stable.

For the other program areas, only a few (one or two) of the economic regions had significant changes in the percentage of graduates selecting jobs within their geographic area. For chefs, cooks, and food preparation,

TABLE 16

STABILITY OF GEOGRAPHIC LOCATION PATTERN OF JOBS AFTER ONE YEAR SELECTED BY SAMPLE OF GRADUATES IN EACH SAMPLE PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Program Area	Economic Region	Percent Selecting Job 1969-70	1970-71	1971-72	X^2
Agri-Technology	6	36.4	22.6	17.4	3.03
Automotive	3	10.8	6.4	8.7	1.13
	4	8.4	5.3	6.7	.68
	7	7.2	13.8	12.5	2.11
	10	12.0	13.8	13.5	.13
	11	27.7	23.4	19.2	1.87
	Other States	8.4	6.4	7.7	.28
Chefs, Cooks, and Food Preparation	3	14.1	8.8	10.0	1.17
	11	37.2	52.9	32.1	7.10**
Clerical	6	8.1	6.8	10.6	.91
	7	9.1	9.1	7.7	.71
	9	12.1	13.1	1.9	9.91***
	11	37.4	32.9	30.1	4.02
	Other States	7.1	6.8	9.6	.66
Electronics	3	7.4	8.9	6.9	.29
	7	7.4	5.6	2.9	1.90
	9	12.3	11.1	13.7	.30
	10	8.6	11.1	8.8	.39
	11	47.5	42.2	41.2	.80
	Other States	6.2	11.1	10.8	1.51
Machine Shop	3	13.0	7.8	13.8	1.89
	11	47.8	47.8	41.5	.95
Practical Nursing	3	18.3	16.0	2.0	15.10***
	7	11.1	8.4	11.9	.81
	9	7.1	7.6	6.9	.03
	10	9.5	9.2	29.5	21.67***
	11	36.5	37.8	30.7	1.35
	Other States	6.3	8.4	5.0	1.08
Sales and Business Management	3	14.6	10.9	9.8	.76
	7	14.6	7.9	9.8	1.62
	10	25.0	6.9	10.8	10.32***
	11	18.8	27.7	23.5	1.48

* Significant at .10 level.
** Significant at .05 level.
*** Significant at .01 level.

it was Economic Region Eleven, for clerical, Region Nine, for practical nursing, Region Three and Two, and for sales and business management, also Region Ten. Generally, where there were changes in proportions over the three years, the changes were very large, ranging from 10.2 percent to 20.8 percent differences from lowest to highest years.

SUMMARY

The stability of the geographic location dimension of the job selection pattern of graduates of sampled program areas over the three year period 1969-70 to 1971-72 was assessed. Only five out of thirty-two comparisons made using chi square analysis show significant differences in the proportion of graduates selecting jobs in a given economic region in Minnesota or other states. Four program areas had no major change in the geographic location aspect of their job selection patterns; the other four program areas had one or two economic regions with significant changes.

Using the economic regions in Minnesota and other states as the categories of the geographic location dimension of job selection patterns and major occupation and industry group as other dimensions of the job selection pattern, the geographic location dimension appears more stable. Further, none of the program areas when comparing the proportion of graduates selecting jobs in other states showed significant differences over the time periods analysed. However, where unstability was apparent for economic regions, the changes were substantial. It appears that program areas vary in the stability of the geographic location dimension of the job selection pattern and that, within a program area, there may be both stable and unstable elements of the pattern.

STABILITY OF JOB SELECTION PATTERN FROM FIRST JOB TO JOB AFTER ONE YEAR

Another dimension of the proposed job selection pattern of graduates of vocational education programs was "time". In order to get some idea of the stability of the job selection pattern in a longitudinal (i.e., observing same graduates over time) rather than cross-sectional way (i.e., observing different groups of graduates over time), the first job selected by graduates of the sample program areas were compared with the jobs they held after one year. In some cases, the first job and job after one year were the same. Although assessment over a longer period of time would be desirable, it was not possible in this study because data covering a longer period of time was not available. As was done previously, the job selection pattern was analysed along the dimension of occupation/industry and geographic location.

Rather than display a job selection pattern for first jobs and then compare it for each combination of occupation and industry and for each economic region in Minnesota and other states, a summary table was developed to show overall stability of each of these dimensions (see Table 17, and 18, respectively).

As shown in Table 17, the percentage of graduates over the three year period who stayed in the same major occupation and industry group from first job to job after one year varied from 56 to 59 percent for most program areas. The exceptions being machine shop at 69.6 percent and practical nursing at 91.3 percent. The percentage making a change in both major occupation and industry group varied from 20.6 percent for agri-technology graduates to 1.6 percent for practical nursing. Except for practical nursing, the percentage of graduates who had a first job but were not employed after one year varied from 10 to 16 percent.

Observing Table 18, it is evident that between 72 and 89 percent of the graduates selected jobs in the same economic region were comparing first job and job after one year. Highest stability using this measure was for practical nursing graduates (88.2 percent) and lowest for the agri-technology graduates (72.1 percent).

From this summary data it is apparent that for the majority of program

TABLE 17

COMPARISON OF JOB SELECTION PATTERN OF FIRST JOB AND ACTIVITY AFTER ONE YEAR BY SAMPLE OF GRADUATES IN EACH SAMPLE PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1970-71

Program Area	Total In Sample	Percent of Total Sample: Same Major Occup. Same Major Ind.	Percent of Total Sample: Same Major Occup. Diff Major Ind.
Agri-Technology	136	56.7	2.9
Automotive	319	56.1	11.9
Chefs, Cooks, and Food Preparation	253	58.9	14.2
Clerical Training	339	58.4	13.6
Electronics	322	57.3	4.7
Machine Shop	296	69.6	2.7
Practical Nursing	365	91.3	.8
Sales and Business Management	288	58.4	3.1

TABLE 18

COMPARISON OF GEOGRAPHIC LOCATION PATTERN OF FIRST JOB AND ACTIVITY AFTER ONE YEAR BY SAMPLE OF GRADUATES IN EACH SAMPLE PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTE, SCHOOL YEARS 1969-70 TO 1970-71

Program Area	Total in Sample	Percent of Total Sample: Same Economic Region	Percent of Total Sample: Different Economic Region
Agri-Technology	136	72.1	27.9
Automotive	319	79.6	20.4
Chefs, Cooks, and Food Preparation	253	75.1	24.9
Clerical Training	339	82.6	17.3
Electronics	322	80.1	19.9
Machine Shop	296	80.7	19.3
Practical Nursing	365	88.2	11.8
Sales and Business Management	288	76.0	24.0

areas only somewhat over 50 percent of the graduates have selected jobs within the same major occupation and industry when comparing first job and job after one year. However, about 80 percent will select jobs in the same economic region for both first job and job after one year. With both the occupation/industry and geographic location dimensions of the job selection pattern, there is considerable variance between program areas.

Table 19 and 20 show the results of chi square analysis to assess the stability of each of the three years covered in this study. In Table 19, comparison is made of the percentage of graduates from each program area whose job selection pattern for first job and job after one year showed a job in the same major occupation and industry group for each year 1969-70, 1970-71, and 1971-72. Only two of the program areas shows significant shift in this percentage over the three years -- auto mechanics and practical nursing.

TABLE 19

STABILITY OF JOB SELECTION PATTERN OF FIRST JOB AND ACTIVITY AFTER ONE YEAR BY SAMPLE OF GRADUATES IN EACH SAMPLE PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Program Area	Percent in Same Major Occupation and Same Major Industry 1969-70	1970-71	1971-72	X^2
Agri-Technology	45.8	65.5	52.6	3.25
Automotive	46.2	62.7	59.5	6.53**
Chefs, Cooks, and Food Preparation	63.4	56.0	57.3	1.05
Clerical Training	58.1	56.9	60.0	.23
Electronics	55.0	63.7	54.2	2.42
Machine Shop	69.5	69.4	69.8	.00
Practical Nursing	93.8	92.8	86.4	4.75*
Sales and Business Management	50.0	56.4	64.7	3.85

* Significant at .10 level
** Significant at .05 level

In Table 20, comparisons are made of the percentage of graduates from each program area whose job selection pattern for first job and job after one year shows that the job was in the same economic region in Minnesota. Here, three of the program areas showed significant changes in the geographic location dimension of the job selection pattern when viewed longitudinally -- automotive, electronics, and practical nursing. From these two analyses of the stability of the longitudinal characteristics of the job selection patterns, it appears that the job selection patterns again differ significantly between program areas. For program areas such as auto mechanics and practical nursing it is not stable in both occupation/industry and geographic location dimensions. Electronics program graduates had job selection patterns that were relatively stable in the occupation/industry dimension but not so in the geographic location dimension. Still other program areas such as agri-technology, chefs, cooks, and food preparation, clerical training, machine shop, and sales and business management were stable in both dimensions of the job selection patterns of graduates.

TABLE 20

STABILITY OF GEOGRAPHIC LOCATION PATTERN OF FIRST JOB AND ACTIVITY AFTER ONE YEAR BY SAMPLE OF GRADUATES IN EACH SAMPLE PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Program Area	Percent in Same Economic Region 1969-70	1970-71	1971-72	X^2
Agri-Technology	58.3	75.4	73.7	2.83
Automotive	67.0	90.0	82.0	17.85***
Chefs, Cooks, and Food Preparation	72.0	84.0	70.8	4.55
Clerical Training	80.3	79.4	87.5	3.14
Electronics	67.0	87.3	85.0	15.86***
Machine Shop	75.6	85.2	80.2	2.78
Practical Nursing	85.4	78.5	90.0	6.44**
Sales and Business Management	79.0	71.8	78.4	1.75

** Significant at .05 level
*** Significant at .01 level

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The concept of a job selection pattern was introduced to explain and document the relationship between vocational education programs and the labor market. A job selection pattern is a description of the jobs selected by program graduates in terms of frequency, occupation, industry, geographic location, and time. The concept of a job selection pattern was proposed as being particularly useful when using labor market demand information in planning vocational education programs. The hypothesis was that if a job selection pattern can be constructed for a vocational education program's leavers and if the pattern is stable over time or if unstable, the instability can be explained, then more valid use can be made of projected labor market demand information toward improving the efficiency of vocational education programs in preparing individuals for gainful employment.

CONCLUSIONS

In order to test the viability of the concept, study was made of the graduates of eight purposefully selected program areas in Minnesota's area vocational technical institutes from the school year 1969-70, 1970-71, and 1971-72. The conclusions based on this assessment are as follows:

1. The job selection patterns of graduates of vocational education programs are complex in terms of the number of occupations and industries represented in the jobs selected by graduates of individual programs.

   Several of the program areas had graduates who had selected jobs which were categorized in upwards of 100 different specific combinations of occupation and industry. When using major occupation and industry groupings, seven of the eight selected program areas had graduates who had selected jobs in almost all of the major groups of both occupations and industries. The complexity and specificity of the job selection pattern can be increased by more specifically labeling the occupations and industries characterizing jobs selected by program graduates. In most cases, it appears clear that there is not a simple, one to one relationship between vocational education program titles and job titles.

2. There is a characteristic pattern to the jobs selected by graduates of vocational education programs which is unique to each program and patterns overlap between program areas.

   Patterns were created by plotting the proportion or number of program graduates who select jobs characterized by various combinations of occupations and industries. The necessary data was obtained by coding information already existing on follow-up questionnaires completed by former vocational education students. Patterns depicted first, the combinations of occupations and industries which were included or excluded and second, for those which were included, the frequency with which the combination was represented in jobs selected by the programs graduates. Patterns varied from concentration in one major occupational group across several different industries, concentration in one major industry group across several occupations, concentration in single occupations and industries, and diffusion across several occupations and industries. Unique patterns appeared for graduates of each program area with overlap of patterns between program areas.

3. The stability over time of the occupation and industry dimensions of the job selection patterns varies between vocational education programs; further, this dimension of the job selection pattern for a program may have both stable and unstable aspects within the pattern.

   A total of 25 tests were made to assess differences in the occupation and industry dimensions of the job selection patterns over a three year period. Ten of the tests showed significant differences in the proportion of graduates selecting jobs representing a particular combination of major occupation and industry groups. Five of the eight sampled program areas showed both significant and unsignificant differences in tested aspects of the job selection pattern of their graduates over time. The use of chi square analysis to test for stability of the job selection pattern did not allow the comprehensiveness and flexibility desired for most productive comparisons of job selection patterns.

4. The job selection patterns of graduates of vocational education programs are complex in terms of the number of geographic locations represented by the location of jobs selected by graduates of individual programs.

Each of the sampled program areas had graduates who had selected jobs located in at least 40 of Minnesota's 87 counties. When using economic regions in Minnesota and other states as a more gross measure of geographic location, all except one program area had graduates in all economic regions in Minnesota and in other states. As with the occupation and industry dimensions of the job selection pattern, the complexity and specificity of the job selection pattern can be increased by more specifically labeling the geographic location characterizing the location of the job selected by program graduates.

5. There is a characteristic pattern to the geographic location of jobs selected by graduates of vocational education programs which is somewhat unique to each program and patterns overlap between program areas.

   Patterns were created by plotting the proportion or number of program graduates who selected jobs in predefined geographic areas (i.e., counties in Minnesota, other states). Patterns depicted first, the geographic areas included and excluded and second, for the areas included, the frequence with which the area was represented by the location of jobs selected by program graduates. Patterns varied from concentration in the Twin City metropolitan area, concentration in the more rural regions, and diffusion across all regions of the states. Somewhat unique patterns appeared for graduates of each program area with the expected overlap of patterns between program areas.

6. The stability over time of the geographic location dimension of job selection patterns varies between vocational education programs; further, this dimension of the job selection pattern for a program may have both stable and unstable aspects within the pattern.

   A total of 32 tests were made to assess differences in the geographic location dimension of job selection patterns over the three year period included in the study. Only five tests showed significant differences in the proportion of graduates selecting jobs in a given geographic area over the three years. Three of the eight program areas showed both significant and unsignificant differences in the proportion of graduates selecting jobs in various geographic areas used to depict geographic location. Again, the chi square analysis was not fully capable of making complete comparisons of this aspect of the job selection pattern.

7. The job selection pattern changes as time passes during the first year after graduates leave vocational education programs; the degree of change varies between programs.

   For six of the eigth program areas studied, only somewhat over 50 percent of the graduates selected jobs representing the same combination of major occupation and major industry group when comparing first job and job after one year. Relative to the geographic location dimension of the job selection pattern, all of the program areas had graduates who selected jobs in the same economic region in Minnesota in about 80 percent of the cases when comparing first job and job after one year. As was the case in comparing job selection patterns cross-sectionally over the three years, here also in a longitudinal comparison, the geographic location dimension appeared more stable than the occupation and industry dimensions of the job selection pattern.

RECOMMENDATIONS

Although the conceptualization of a job selection pattern as a useful means of linking vocational education programs and the labor market for planning purposes is still incomplete and testing of the concept was limited to selected program areas at the post secondary level in only one State, the following recommendations appear reasonable at this time:

1. Follow up data on graduates of vocational education programs at the secondary, post secondary, and adult levels include the information necessary to construct a job selection pattern for graduates.

   Only if this data is gathered can further assessment of the utility of the concept of a job selection pattern be completed; lack of adequate data has been a major handicap in developing the concept. In order to construct the job selection patterns, data is needed from which to determine the detailed occupation, industry, and geographic location of the job selected by program graduates. Information not available in this study but needed to complete the "time" dimension of the job selection pattern is the date at which the graduate becomes available for work and the dates various jobs are selected.

2. Job selection patterns be constructed and analysed for each individual program area of vocational education.

   From the conclusions of this study, it appears that patterns are unique for each program area. Patterns may also be unique to individual programs and schools but this was not tested in this study.

3. Study be initiated to explain the unstable aspects of the job selection patterns of graduates of vocational education programs.

   Several of the program areas included in this study had unstable elements; no reasons were investigated as to why these instabilities occurred. As was stated earlier, unless these instabilities can be explained and predicted, the utility of projected labor market demand information is much reduced in planning vocational education programs. Also, an understanding of factors causing unstable patterns may well lead to identifying means of influencing job selection patterns where change is warranted.

4. New means of displaying and comparing job selection patterns be identified and/or developed.

   The job selection pattern has several dimensions. How can they be best displayed simultaneously to create the most useful depiction of the pattern? What units should be used? What level of detail is most useful? The results of this study showed that the pattern becomes very complex and cumbersome to display as the specificity and number of dimensions increase. Chi square analysis proved to have several limitations in comparing patterns for the same program area over time and comparing between program areas.

APPENDIX I

PROGRAMS AND PROGRAM AREAS

AGRI-TECHNOLOGY

- Ag Chemicals and Seed Technology
- Agriculture Production and Irrigation
- Agricultural Supplies Technology
- Feed and Nutrition Technology
- Soil and Fertilizer Technology
- Specialty Crops

AUTOMOTIVE

- Auto Mechanics
- Automobile Management
- Automobile Tune-Up
- Automobile Service Specialist
- Automotive Technician
- Wheel Alignment and Brake Service
- Auto Body-Light Truck Mechanics
- Automotive Transmission Specialist
- Automotive Electric and Carburation Specialist

CHEFS, COOKS, AND FOOD PREPARATION

- Commercial Foods
- Commercial Cooking and Baking
- Dietetic Assistant
- Catering
- Kitchen Assistant
- Quantity Food Preparation

CLERICAL TRAINING

- Clerical Training and Key Punch
- Educational Office Occupations
- General Office Practices
- Insurance Procedures
- Law Enforcement Office Occupations
- Personnel Office Occupations
- Steno-Clerical
- Traffic Offic Occupations
- Typing and Related
- General Secretary
- Corporate Receptionist
- Legal Office Occupations
- Secretarial Science

ELECTRONICS

Communications
Electronics Engineering Technology
Industrial Electronics
Instrumentation and Computer Maintenance
Mobile Communications Technology
Radio and T. V. Repair
Radio, T. V., and Home Entertainment Equipment Service
Avionics (Aviation-Related Electronics)
Cable T. V. Installation
Electronic Technology

MACHINE SHOP

Machine Operator
Machine Tool Operator
Machine Tool Processes
Machine Tool Rebuilding
Machinist
Numerical Control Technology
Production Machinist

PRACTICAL NURSING

Practical Nurse

SALES AND BUSINESS MANAGEMENT

Marketing-Merchandising
Retail Merchandising
Sales Associate
Sales and Marketing
Wholesaling, Retailing and Marketing Management
Sales and Management
Marketing Management
Sales and Marketing Management
Small Business Management
Private and Public Assembly Facilities Management
Supermarket Management

APPENDIX II

FOLLOW-UP QUESTIONNAIRE

Pages 77 and 78, containing a followup questionnaire, were copyrighted and therefore removed.

APPENDIX III

INDUSTRY AND OCCUPATION CATEGORIES

INDUSTRIAL CLASSIFICATION SYSTEM

Equivalent numeric codes follow the alphabetic codes. Either code may be utilized, depending upon the processing method. Numbers in parentheses following the industry categories are the SIC definitions. "N.e.c." means "not elsewhere classified."

Industry Code	AGRICULTURE, FORESTRY, AND FISHERIES
A (017)	Agricultural production (01)
018	Agricultural services, except horticultural (07 except 0713 and 073)
019	Horticultural services (073)
027	Forestry (08)
028	Fisheries (09)
	MINING
047	Metal mining (10)
048	Coal mining (11, 12)
049	Crude petroleum and natural gas extractions (13)
057	Nonmetallic mining and quarrying, except fuel (14)
	CONSTRUCTION
067	General building contractors (15)
068	General contractors, except building (16)
B (069)	Special trade contractors (17)
077	Not specified construction
	MANUFACTURING
	Durable goods
	Lumber and wood products, except furniture
107	Logging (241)
108	Sawmills, planing mills, and mill work (242, 243)
109	Miscellaneous wood products (244, 249)
118	Furniture and fixtures (25)
	Stone, clay, and glass products
119	Glass and glass products (321-323)
127	Cement, concrete, gypsum, and plaster products (324, 327)
128	Structural clay products (325)
137	Pottery and related products (326)
138	Miscellaneous nonmetallic mineral and stone products (328, 329)
	Metal industries
139	Blast furnaces, steel works, rolling and finishing mills (3312, 3313)
147	Other primary iron and steel industries (3315-3317, 332, 3391, part 3399)
148	Primary aluminum industries (3334, part 334, 3352, 3361, part 3392, part 3399)
149	Other primary nonferrous industries (3331-3333, 3339, part 334, 3351, 3356, 3357, 3362, 3369, part 3392, part 3399)
157	Cutlery, hand tools, and other hardware (342)
158	Fabricated structural metal products (344)
159	Screw machine products (345)
167	Metal stamping (346)

Industry Code	MANUFACTURING—Continued
168	Miscellaneous fabricated metal products (341, 343, 347, 348, 349)
169	Not specified metal industries
	Machinery, except electrical
177	Engines and turbines (351)
178	Farm machinery and equipment (352)
179	Construction and material handling machines (353)
187	Metalworking machinery (354)
188	Office and accounting machines (357 except 3573)
189	Electronic computing equipment (3573)
197	Machinery, except electrical, n.e.c. (355, 356, 358, 359)
198	Not specified machinery
	Electrical machinery, equipment, and supplies
199	Household appliances (363)
207	Radio, T.V., and communication equipment (365, 366)
208	Electrical machinery, equipment, and supplies, n.e.c. (361, 362, 364, 367, 369)
209	Not specified electrical machinery, equipment, and supplies
	Transportation equipment
219	Motor vehicles and motor vehicle equipment (371)
227	Aircraft and parts (372)
228	Ship and boat building and repairing (373)
229	Railroad locomotives and equipment (374)
237	Mobile dwellings and campers (3791)
238	Cycles and miscellaneous transportation equipment (375, 3799)
	Professional and photographic equipment, and watches
239	Scientific and controlling instruments (381, 382)
247	Optical and health services supplies (383, 384, 385)
248	Photographic equipment and supplies (386)
249	Watches, clocks, and clockwork-operated devices (387)
257	Not specified professional equipment
258	Ordnance (19)
259	Miscellaneous manufacturing industries (39)
	Nondurable goods
	Food and kindred products
268	Meat products (201)
269	Dairy products (202)
278	Canning and preserving fruits, vegetables, and sea foods (203)
279	Grain-mill products (204, 0713)
287	Bakery products (205)
288	Confectionery and related products (20

Industry Code	MANUFACTURING—Continued
289	Beverage industries (208)
297	Miscellaneous food preparation and kindred products (206, 209)
298	Not specified food industries
299	Tobacco manufactures (21)
	Textile mill products
307	Knitting mills (225)
308	Dyeing and finishing textiles, except wool and knit goods (226)
309	Floor coverings, except hard surface (227)
317	Yarn, thread, and fabric mills (221-224, 228)
318	Miscellaneous textile mill products (229)
	Apparel and other fabricated textile products
C (319)	Apparel and accessories (231-238)
327	Miscellaneous fabricated textile products (239)
	Paper and allied products
328	Pulp, paper, and paperboard mills (261-263, 266)
329	Miscellaneous paper and pulp products (264)
337	Paperboard containers and boxes (265)
	Printing, publishing, and allied industries
338	Newspaper publishing and printing (271)
339	Printing, publishing, and allied industries, except newspapers (272-279)
	Chemicals and allied products
347	Industrial chemicals (281)
348	Plastics, synthetics and resins, except fibers (282, except 2823 and 2824)
349	Synthetic fibers (2823, 2824)
357	Drugs and medicines (283)
358	Soaps and cosmetics (284)
359	Paints, varnishes, and related products (285)
367	Agricultural chemicals (287)
368	Miscellaneous chemicals (286, 289)
369	Not specified chemicals and allied products
	Petroleum and coal products
377	Petroleum refining (291)
378	Miscellaneous petroleum and coal products (295, 299)
	Rubber and miscellaneous plastic products
379	Rubber products (301-303, 306)
387	Miscellaneous plastic products (307)
	Leather and leather products
388	Tanned, curried, and finished leather (311)
389	Footwear, except rubber (313, 314)
397	Leather products, except footwear (312, 315-317, 319)
398	Not specified manufacturing industries

TRANSPORTATION, COMMUNICATIONS, AND OTHER PUBLIC UTILITIES

Transportation

Industry Code	
D (407)	Railroads and railway express service (40)
408	Street railways and bus lines (411, 413-415, 417)
409	Taxicab service (412)
417	Trucking service (421, 423)
418	Warehousing and storage (422)
419	Water transportation (44)
427	Air transportation (45)
428	Pipe lines, except natural gas (46)
429	Services incidental to transportation (47)

TRANSPORTATION, COMMUNICATIONS, AND OTHER PUBLIC UTILITIES—Continued

Communications

Industry Code	
447	Radio broadcasting and television (483)
448	Telephone (wire and radio) (481)
449	Telegraph and miscellaneous communication services (482, 489)

Utilities and sanitary services

Industry Code	
467	Electric light and power (491)
468	Electric-gas utilities (493)
469	Gas and steam supply systems (492, 496)
477	Water supply (494)
478	Sanitary services (495)
479	Other and not specified utilities (497)

WHOLESALE AND RETAIL TRADE

Wholesale trade

Industry Code	
507	Motor vehicles and equipment (501)
508	Drugs, chemicals, and allied products (502)
509	Dry goods and apparel (503)
527	Food and related products (504)
528	Farm products—raw materials (505)
529	Electrical goods (506)
537	Hardware, plumbing, and heating supplies (507)
538	Not specified electrical and hardware products
539	Machinery equipment and supplies (508)
557	Metals and minerals, n.e.c. (5091)
558	Petroleum products (5092)
559	Scrap and waste materials (5093)
567	Alcoholic beverages (5095)
568	Paper and its products (5096)
569	Lumber and construction materials (5098)
587	Wholesalers, n.e.c. (5094, 5097, 5099)
588	Not specified wholesale trade

Retail trade

Industry Code	
607	Lumber and building material retailing (521-524)
608	Hardware and farm equipment stores (525)
E (609)	Department and mail order establishments (531, 532)
617	Limited price variety stores (533)
618	Vending machine operators (534)
619	Direct selling establishments (535)
627	Miscellaneous general merchandise stores (539)
F (628)	Grocery stores (541)
629	Dairy products stores (545)
637	Retail bakeries (546)
638	Food stores, n.e.c. (542-544, 549)
639	Motor vehicle dealers (551, 552)
647	Tire, battery, and accessory dealers (553)
648	Gasoline service stations (554)
649	Miscellaneous vehicle dealers (559)
657	Apparel and accessories stores, except shoe stores (56 except 566)
658	Shoe stores (566)
667	Furniture and home furnishings stores (571)
668	Household appliances, TV, and radio stores (572, 573)
G (669)	Eating and drinking places (58)
677	Drug stores (591)

WHOLESALE AND RETAIL TRADE–Continued

Retail trade–Continued

Industry Code	
678	Liquor stores (592)
679	Farm and garden supply stores (596)
687	Jewelry stores (597)
688	Fuel and ice dealers (598)
689	Retail florists (5992)
697	Miscellaneous retail stores (593-595, 599 exc. 5992)
698	Not specified retail trade

FINANCE, INSURANCE, AND REAL ESTATE

Industry Code	
707	Banking (60)
708	Credit agencies (61)
709	Security, commodity brokerage, and investment companies (62, 67)
717	Insurance (63, 64)
718	Real estate, incl. real estate-insurance-law offices (65, 66)

BUSINESS AND REPAIR SERVICES

Industry Code	
727	Advertising (731)
728	Services to dwellings and other buildings (734)
729	Commercial research, development, and testing labs (7391, 7397)
737	Employment and temporary help agencies (736, 7398)
738	Business management and consulting services (part 7392)
739	Computer programing services (part 7392)
747	Detective and protective services (7393)
748	Business services, n.e.c. (732, 733, 735, 7394, 7395, 7396, 7399)
749	Automobile services, except repair (751, 752, 754)
757	Automobile repair and related services (753)
758	Electrical repair shops (762, 7694)
759	Miscellaneous repair services (763, 764, 769, except 7694)

PERSONAL SERVICES

Industry Code	
H (769)	Private households (88)
777	Hotels and motels (701)
778	Lodging places, except hotels and motels (702, 703, 704)
779	Laundering, cleaning, and other garment services (721, 727)
787	Beauty shops (723)
788	Barber shops (724)
789	Shoe repair shops (725)
797	Dressmaking shops (part 729)
798	Miscellaneous personal services (722, 726, part 729)

ENTERTAINMENT AND RECREATION SERVICES

Industry Code	
807	Theaters and motion pictures (78, 792)
808	Bowling alleys, billiard and pool parlors (793)
809	Miscellaneous entertainment and recreation services (791, 794)

PROFESSIONAL AND RELATED SERVICES

Industry Code	
828	Offices of physicians (801, 803)
829	Offices of dentists (802)
837	Offices of chiropractors (804)
J (838)	Hospitals (806)
839	Convalescent institutions (8092)
847	Offices of health practitioners, n.e.c. (part 8099)
848	Health services, n.e.c. (807, part 8099)
849	Legal services (81)
K (857)	Elementary and secondary schools (821)
858	Colleges and universities (822)
859	Libraries (823)
867	Educational services, n.e.c. (824, 829)
868	Not specified educational services
869	Museums, art galleries, and zoos (84)
877	Religious organizations (866)
878	Welfare services (part 867)
879	Residential welfare facilities (part 867)
887	Nonprofit membership organizations (861-865, 869)
888	Engineering and architectural services (891)
889	Accounting, auditing, and bookkeeping services (893)
897	Miscellaneous professional and related services (892, 899)

PUBLIC ADMINISTRATION

Industry Code	
907	Postal service (part 9190)
L (917)	Federal public administration (part 9190, 9490)
927	State public administration (9290)
M (937)	Local public administration (9390)

999 INDUSTRY NOT REPORTED[1]

ALLOCATION CATEGORIES[2]

Industry Code	
029	Agriculture, forestry, and fisheries–allocated
058	Mining–allocated
078	Construction–allocated
267	Manufacturing, durable goods–allocated
399	Manufacturing, nondurable goods–allocated
499	Transportation, communications, and other public utilities–allocated
599	Wholesale trade–allocated
699	Retail trade–allocated
719	Finance, insurance, and real estate–allocated
767	Business and repair services–allocated
799	Personal services–allocated
817	Entertainment and recreation services–allocated
899	Professional and related services–allocated
947	Public administration–allocated

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[1] This code is used to identify not reported industries in surveys where the not reported cases are not allocated.

[2] Those returns from the Population Census which do not have an industry entry are allocated among the major industry groups during computer processing. These cases are labeled with the code for the "allocation" category to which they are assigned. (See text, page IV).

OCCUPATIONAL CLASSIFICATION SYSTEM

Equivalent numeric codes follow the alphabetic codes. Either code may be utilized, depending on the processing method. "N.e.c." means "not elsewhere classified."

Occupation Code	PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS
001	Accountants
002	Architects
	Computer specialists
003	Computer programmers
004	Computer systems analysts
005	Computer specialists, n.e.c.
	Engineers
006	Aeronautical and astronautical engineers
010	Chemical engineers
011	Civil engineers
012	Electrical and electronic engineers
013	Industrial engineers
014	Mechanical engineers
015	Metallurgical and materials engineers
020	Mining engineers
021	Petroleum engineers
022	Sales engineers
023	Engineers, n.e.c.
024	Farm management advisors
025	Foresters and conservationists
026	Home management advisors
	Lawyers and judges
030	Judges
031	Lawyers
	Librarians, archivists, and curators
032	Librarians
033	Archivists and curators
	Mathematical specialists
034	Actuaries
035	Mathematicians
036	Statisticians
	Life and physical scientists
042	Agricultural scientists
043	Atmospheric and space scientists
044	Biological scientists
045	Chemists
051	Geologists
052	Marine scientists
053	Physicists and astronomers
054	Life and physical scientists, n.e.c.
055	Operations and systems researchers and analysts
056	Personnel and labor relations workers
	Physicians, dentists, and related practitioners
061	Chiropractors
062	Dentists
063	Optometrists
064	Pharmacists
065	Physicians, medical and osteopathic
071	Podiatrists
072	Veterinarians
073	Health practitioners, n.e.c.

Occupation Code	PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS—Continued
	Nurses, dietitians, and therapists
074	Dietitians
075	Registered nurses
076	Therapists
	Health technologists and technicians
080	Clinical laboratory technologists and technicians
081	Dental hygienists
082	Health record technologists and technicians
083	Radiologic technologists and technicians
084	Therapy assistants
085	Health technologists and technicians, n.e.c.
	Religious workers
086	Clergymen
090	Religious workers, n.e.c.
	Social scientists
091	Economists
092	Political scientists
093	Psychologists
094	Sociologists
095	Urban and regional planners
096	Social scientists, n.e.c.
	Social and recreation workers
100	Social workers
101	Recreation workers
	Teachers, college and university
102	Agriculture teachers
103	Atmospheric, earth, marine, and space teachers
104	Biology teachers
105	Chemistry teachers
110	Physics teachers
111	Engineering teachers
112	Mathematics teachers
113	Health specialties teachers
114	Psychology teachers
115	Business and commerce teachers
116	Economics teachers
120	History teachers
121	Sociology teachers
122	Social science teachers, n.e.c.
123	Art, drama, and music teachers
124	Coaches and physical education teachers
125	Education teachers
126	English teachers
130	Foreign language teachers
131	Home economics teachers
132	Law teachers
133	Theology teachers
134	Trade, industrial, and technical teachers
135	Miscellaneous teachers, college and university
140	Teachers, college and university, subject not specified

Occupation Code	PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS—Continued
	Teachers, except college and university
141	Adult education teachers
N (142)	Elementary school teachers
143	Prekindergarten and kindergarten teachers
144	Secondary school teachers
145	Teachers, except college and university, n.e.c.
	Engineering and science technicians
150	Agriculture and biological technicians, except health
151	Chemical technicians
152	Draftsmen
153	Electrical and electronic engineering technicians
154	Industrial engineering technicians
155	Mechanical engineering technicians
156	Mathematical technicians
161	Surveyors
162	Engineering and science technicians, n.e.c.
	Technicians, except health, and engineering and science
163	Airplane pilots
164	Air traffic controllers
165	Embalmers
170	Flight engineers
171	Radio operators
172	Tool programmers, numerical control —
173	Technicians, n.e.c.
174	Vocational and educational counselors
	Writers, artists, and entertainers
175	Actors
180	Athletes and kindred workers
181	Authors
182	Dancers
183	Designers
184	Editors and reporters
185	Musicians and composers
190	Painters and sculptors
191	Photographers
192	Public relations men and publicity writers
193	Radio and television announcers
194	Writers, artists, and entertainers, n.e.c.
195	Research workers, not specified

MANAGERS AND ADMINISTRATORS, EXCEPT FARM

201	Assessors, controllers, and treasurers; local public administration
202	Bank officers and financial managers
203	Buyers and shippers, farm products
205	Buyers, wholesale and retail trade
210	Credit men
211	Funeral directors
212	Health administrators
213	Construction inspectors, public administration
215	Inspectors, except construction, public administration
216	Managers and superintendents, building
220	Office managers, n.e.c.
221	Officers, pilots, and pursers; ship
222	Officials and administrators; public administration, n.e.c.
223	Officials of lodges, societies, and unions
224	Postmasters and mail superintendents
225	Purchasing agents and buyers, n.e.c.
226	Railroad conductors

Occupation Code	MANAGERS AND ADMINISTRATORS, EXCEPT FARM—Continued
230	Restaurant, cafeteria, and bar managers
231	Sales managers and department heads, retail trade
233	Sales managers, except retail trade
235	School administrators, college
240	School administrators, elementary and secondary
245	Managers and administrators, n.e.c.

SALES WORKERS

260	Advertising agents and salesmen
261	Auctioneers
262	Demonstrators
264	Hucksters and peddlers
265	Insurance agents, brokers, and underwriters
266	Newsboys
270	Real estate agents and brokers
271	Stock and bond salesmen
280	Salesmen and sales clerks, n.e.c.[1]

CLERICAL AND KINDRED WORKERS

301	Bank tellers
303	Billing clerks
P (305)	Bookkeepers
310	Cashiers
311	Clerical assistants, social welfare
312	Clerical supervisors, n.e.c.
313	Collectors, bill and account
314	Counter clerks, except food
315	Dispatchers and starters, vehicle
320	Enumerators and interviewers
321	Estimators and investigators, n.e.c.
323	Expediters and production controllers
325	File clerks
326	Insurance adjusters, examiners, and investigators
330	Library attendants and assistants
331	Mail carriers, post office
332	Mail handlers, except post office
333	Messengers and office boys
334	Meter readers, utilities
	Office machine operators
341	Bookkeeping and billing machine operators
342	Calculating machine operators
343	Computer and peripheral equipment operators
344	Duplicating machine operators

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[1] Category "280 Salesmen and sales clerks, n.e.c." was subdivided in the Census into 5 occupation groups dependent on industry. The industry codes are shown in parentheses.

Occ. Code	
281	Sales representatives, manufacturing industries (Ind. 107-399)
282	Sales representatives, wholesale trade (Ind. 017-058, 507-599)
283	Sales clerks, retail trade (Ind. 608-699 except 618, 639, 649, 667, 668, 688)
284	Salesmen, retail trade (Ind. 607, 618, 639, 649, 667, 668, 688)
285	Salesmen of services and construction (Ind. 067-078, 407-499, 707-947)

Occupation Code	CLERICAL AND KINDRED WORKERS—Continued
	Office machine operators--Continued
345	Key punch operators
350	Tabulating machine operators
355	Office machine operators, n.e.c.
360	Payroll and timekeeping clerks
361	Postal clerks
362	Proofreaders
363	Real estate appraisers
364	Receptionists
	Secretaries
370	Secretaries, legal
371	Secretaries, medical
Q (372)	Secretaries, n.e.c.
374	Shipping and receiving clerks
375	Statistical clerks
376	Stenographers
381	Stock clerks and storekeepers
382	Teacher aides, exc. school monitors
383	Telegraph messengers
384	Telegraph operators
385	Telephone operators
390	Ticket, station, and express agents
391	Typists
392	Weighers
394	Miscellaneous clerical workers
395	Not specified clerical workers

CRAFTSMEN AND KINDRED WORKERS

Occupation Code	CRAFTSMEN AND KINDRED WORKERS
401	Automobile accessories installers
402	Bakers
403	Blacksmiths
404	Boilermakers
405	Bookbinders
410	Brickmasons and stonemasons
411	Brickmasons and stonemasons, apprentices
412	Bulldozer operators
413	Cabinetmakers
R (415)	Carpenters
416	Carpenter apprentices
420	Carpet installers
421	Cement and concrete finishers
422	Compositors and typesetters
423	Printing trades apprentices, exc. pressmen
424	Cranemen, derrickmen, and hoistmen
425	Decorators and window dressers
426	Dental laboratory technicians
430	Electricians
431	Electrician apprentices
433	Electric power linemen and cablemen
434	Electrotypers and stereotypers
435	Engravers, exc. photoengravers
436	Excavating, grading, and road machine operators; exc. bulldozer
440	Floor layers, exc. tile setters
441	Foremen, n.e.c.
442	Forgemen and hammermen
443	Furniture and wood finishers
444	Furriers
445	Glaziers
446	Heat treaters, annealers, and temperers
450	Inspectors, scalers, and graders; log and lumber
452	Inspectors, n.e.c.

Occupation Code	CRAFTSMEN AND KINDRED WORKERS—Continued
453	Jewelers and watchmakers
454	Job and die setters, metal
455	Locomotive engineers
456	Locomotive firemen
461	Machinists
462	Machinist apprentices
	Mechanics and repairmen
470	Air conditioning, heating, and refrigeration
471	Aircraft
472	Automobile body repairmen
S (473)	Automobile mechanics
474	Automobile mechanic apprentices
475	Data processing machine repairmen
480	Farm implement
481	Heavy equipment mechanics, incl. diesel
482	Household appliance and accessory installers and mechanics.
483	Loom fixers
484	Office machine
485	Radio and television
486	Railroad and car shop
491	Mechanic, exc. auto, apprentices
492	Miscellaneous mechanics and repairmen
495	Not specified mechanics and repairmen
501	Millers; grain, flour, and feed
502	Millwrights
503	Molders, metal
504	Molder apprentices
505	Motion picture projectionists
506	Opticians, and lens grinders and polishers
510	Painters, construction and maintenance
511	Painter apprentices
512	Paperhangers
514	Pattern and model makers, exc. paper
515	Photoengravers and lithographers
516	Piano and organ tuners and repairmen
520	Plasterers
521	Plasterer apprentices
522	Plumbers and pipe fitters
523	Plumber and pipe fitter apprentices
525	Power station operators
530	Pressmen and plate printers, printing
531	Pressman apprentices
533	Rollers and finishers, metal
534	Roofers and slaters
535	Sheetmetal workers and tinsmiths
536	Sheetmetal apprentices
540	Shipfitters
542	Shoe repairmen
543	Sign painters and letterers
545	Stationary engineers
546	Stone cutters and stone carvers
550	Structural metal craftsmen
551	Tailors
552	Telephone installers and repairmen
554	Telephone linemen and splicers
560	Tile setters
561	Tool and die makers
562	Tool and die maker apprentices
563	Upholsterers
571	Specified craft apprentices, n.e.c.
572	Not specified apprentices

Occupation Code	CRAFTSMEN AND KINDRED WORKERS—Continued
575	Craftsmen and kindred workers, n.e.c.
580	Former members of the Armed Forces

OPERATIVES, EXCEPT TRANSPORT

601	Asbestos and insulation workers
T (602)	Assemblers
603	Blasters and powdermen
604	Bottling and canning operatives
605	Chainmen, rodmen, and axmen; surveying
610	Checkers, examiners, and inspectors; manufacturing
611	Clothing ironers and pressers
612	Cutting operatives, n.e.c.
613	Dressmakers and seamstresses, except factory
614	Drillers, earth
615	Dry wall installers and lathers
620	Dyers
621	Filers, polishers, sanders, and buffers
622	Furnacemen, smeltermen, and pourers
623	Garage workers and gas station attendants
624	Graders and sorters, manufacturing
625	Produce graders and packers, except factory and farm
626	Heaters, metal
630	Laundry and dry cleaning operatives, n.e.c.
631	Meat cutters and butchers, exc. manufacturing
633	Meat cutters and butchers, manufacturing
634	Meat wrappers, retail trade
635	Metal platers
636	Milliners
640	Mine operatives, n.e.c.
641	Mixing operatives -
642	Oilers and greasers, exc. auto
643	Packers and wrappers, except meat and produce
644	Painters, manufactured articles
645	Photographic process workers
	Precision machine operatives
650	Drill press operatives
651	Grinding machine operatives
652	Lathe and milling machine operatives
653	Precision machine operatives, n.e.c.
656	Punch and stamping press operatives
660	Riveters and fasteners
661	Sailors and deckhands
662	Sawyers
663	Sewers and stitchers
664	Shoemaking machine operatives
665	Solderers
666	Stationary firemen
	Textile operatives
670	Carding, lapping, and combing operatives
671	Knitters, loopers, and toppers
672	Spinners, twisters, and winders
673	Weavers
674	Textile operatives, n.e.c.
680	Welders and flame-cutters
681	Winding operatives, n.e.c.
690	Machine operatives, miscellaneous specified
692	Machine operatives, not specified
694	Miscellaneous operatives
695	Not specified operatives

Occupation Code	TRANSPORT EQUIPMENT OPERATIVES
701	Boatmen and canalmen
703	Bus drivers
704	Conductors and motormen, urban rail transit
705	Deliverymen and routemen
706	Fork lift and tow motor operatives
710	Motormen; mine, factory, logging camp, etc.
711	Parking attendants
712	Railroad brakemen
713	Railroad switchmen
714	Taxicab drivers and chauffeurs
U (715)	Truck drivers

LABORERS, EXCEPT FARM

740	Animal caretakers, exc. farm
750	Carpenters' helpers
V (751)	Construction laborers, exc. carpenters' helpers
752	Fishermen and oystermen
753	Freight and material handlers
754	Garbage collectors
755	Gardeners and groundskeepers, exc. farm
760	Longshoremen and stevedores
761	Lumbermen, raftsmen, and woodchoppers
762	Stock handlers
763	Teamsters
764	Vehicle washers and equipment cleaners
770	Warehousemen, n.e.c.
790	Miscellaneous laborers
785	Not specified laborers

FARMERS AND FARM MANAGERS

W (801)	Farmers (owners and tenants)
802	Farm managers

FARM LABORERS AND FARM FOREMEN

821	Farm foremen
822	Farm laborers, wage workers
823	Farm laborers, unpaid family workers
824	Farm service laborers, self-employed

SERVICE WORKERS, EXC. PRIVATE HOUSEHOLD

	Cleaning service workers
901	Chambermaids and maids, except private household
902	Cleaners and charwomen
X (903)	Janitors and sextons
	Food service workers
910	Bartenders
911	Busboys
912	Cooks, except private household
913	Dishwashers
914	Food counter and fountain workers
Y (915)	Waiters
916	Food service workers, n.e.c., except private household

Occupation Code	SERVICE WORKERS, EXC. PRIVATE HOUSEHOLD—Continued
	Health service workers
921	Dental assistants
922	Health aides, exc. nursing
923	Health trainees
924	Lay midwives
925	Nursing aides, orderlies, and attendants
926	Practical nurses
	Personal service workers
931	Airline stewardesses
932	Attendants, recreation and amusement
933	Attendants, personal service, n.e.c.
934	Baggage porters and bellhops
935	Barbers
940	Boarding and lodging house keepers
941	Bootblacks
942	Child care workers, exc. private household
943	Elevator operators
944	Hairdressers and cosmetologists
945	Personal service apprentices
950	Housekeepers, exc. private household
952	School monitors
953	Ushers, recreation and amusement
954	Welfare service aides
	Protective service workers
960	Crossing guards and bridge tenders
961	Firemen, fire protection
962	Guards and watchmen
963	Marshals and constables
964	Policemen and detectives
965	Sheriffs and bailiffs

Occupation Code	PRIVATE HOUSEHOLD WORKERS
980	Child care workers, private household
981	Cooks, private household
982	Housekeepers, private household
983	Laundresses, private household
Z (984)	Maids and servants, private household
995	OCCUPATION NOT REPORTED[2]
	ALLOCATION CATEGORIES[3]
196	Professional, technical, and kindred workers—allocated
246	Managers and administrators, except farm—allocated
296	Sales workers—allocated
396	Clerical and kindred workers—allocated
586	Craftsmen and kindred workers—allocated
696	Operatives, except transport—allocated
726	Transport equipment operatives—allocated
796	Laborers, except farm—allocated
806	Farmers and farm managers—allocated
846	Farm laborers and farm foremen—allocated
976	Service workers, exc. private household—allocated
986	Private household workers—allocated

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[2] This code is used to identify not reported occupations in surveys where the not reported cases are not allocated.

[3] Those returns from the Population Census which do not have an occupation entry are allocated among the major occupation groups during computer processing. These cases are labeled with the code for the "allocation" category to which they are assigned. (See text, page IV).

APPENDIX IV

DETAILED OCCUPATION AND INDUSTRY DIMENSION OF JOB SELECTION PATTERNS

TABLE 21

DETAILED OCCUPATION AND INDUSTRY OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE AGRI-TECHNOLOGY PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOLS YEARS 1969-70 TO 1971-72

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
025 Foresters and Conservationists							3	2.5
027 Forestry			1	2.0			1	.8
937 Local Public administration			1	2.0	1	2.2	2	1.7
085 Health technologist and technician, n.e.c.							1	.8
838 Hosptials					1	2.2	1	.8
150 Agricultural and biological technician, except health							1	.8
679 Farm and garden supply stores	1	4.5					1	.8
231 Sales managers and department heads, retail sales							1	.8
679 Farm and garden supply stores	1	4.5					1	.8
245 Managers and administrators, n.e.c.							16	13.6
018 Agriculture services, except horticultural			1	2.0	1	2.2	2	1.7
367 Agricultural chemicals	1	4.5	2	4.0			3	2.5
528 Farm products-raw materials					2	4.3	2	1.7
679 Farm and garden supply stores			6	12.0	1	2.2	7	5.9
749 Automobile services, except repair					1	2.2	1	.8
759 Miscellaneous repair service					1	2.2	1	.8
280 Salesmen and sales clerks, n.e.c.							21	17.7
279 Grain-mill products					1	2.2	1	.8
367 Agricultural chemicals			1	2.0			1	.8
398 Not specified manufacturing industries			1	2.0			1	.8
528 Farm products - raw materials					4	8.7	4	3.4
587 Wholesalers, n.e.c.					1	2.2	1	.8
608 Hardware and farm equipment stores					2	4.3	2	1.7
667 Furniture and home furnishing stores			1	2.0			1	.8

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
679 Farm and garden supply stores	3	13.6	3	6.0	1	2.2	7	5.9
709 Security, commodity brokerage, & investment companies					1	2.2	1	.8
757 Automobile repair and related services			1	2.0			1	.8
381 Stock clerks and storekeepers							1	.8
627 Miscellaneous general merchanise store					1	2.2	1	.8
415 Carpenters							3.	2.5
067 General building contractors			2	4.0	1	2.2	3	2.5
422 Compositors and typesetters							1	.8
158 Fabricated structural metal products			1	2.0			1	.8
441 Foremen, n.e.c.							7	5.9
367 Agricultural chemicals	3	13.6	1	2.0			4	3.4
528 Farm products-raw materials					2	4.3	2	1.7
529 Electrical goods	1	4.5					1	.8
443 Furniture and wood finishers							1	.8
759 Miscellaneous repair services					1	2.2	1	.8
480 Farm implement							1	.8
528 Farm products-raw materials					1	2.2	1	.8
481 Heavy equipment mechanics, include diesel							1	.8
068 General contractors, except buildings	1	4.5					1	.8
501 Millers, grain, flour & feed							2	1.7
279 Grain-mill products					2	4.3	2	1.7
601 Asbestos & insulation workers							1	.8
067 General building contractors			1	2.0			1	.8

Occupation/Industry	1969-70 No.	1969-70 %	1970-71 No.	1970-71 %	1971-72 No.	1971-72 %	TOTAL No.	TOTAL %
602 Assemblers							3	2.5
179 Construction and material handling machines					1	2.2	1	.8
259 Misc. manufacturing industries			1	2.0			1	.8
379 Rubber products			1	2.0			1	.8
605 Chainmen, rodmen & axmen; surveying							1	.8
937 Local public administration			1	2.0			1	.8
612 Cutting operatives, n.e.c.							1	.8
607 Lumber and building material retailing			1	2.0			1	.8
614 Drillers, earth							1	.8
069 Special trade contractors					1	2.2	1	.8
622 Furnacemen, smeltermen, & pourers							1	.8
108 Sawmills, planing mills, and mill works			1	2.0			1	.8
641 Mixing operatives							1	.8
367 Agricultural chemicals			1	2.0			1	.8
680 Welders and flame-cutters							1	.8
197 Machinery, exc electrical					1	2.2	1	.8
690 Machine operatives, misc. specified							2	1.7
279 Grain-mill products			1	2.0	1	2.2	2	1.7
694 Miscellaneous operatives.							1	.8
279 Grain-mill products					1	2.2	1	.8
715 Truck drivers							8	6.7
018 Agricultural services, except horticultural			1	2.0			1	.8
138 Misc. nonmetalic mineral and stone products					1	2.2	1	.8
279 Grain-mill products			1	2.0			1	.8
417 Trucking services					1	2.2	1	.8
527 Food & related products			1	2.0			1	.8
628 Grocery stores	1	4.5					1	.8
709 Security, commodity brokerage, & investment companies					1	2.2	1	.8

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
753 Freight & Material handlers							2	1.7
478 Sanitary service					1	2.2	1	.8
528 Farm products-raw materials					1	2.2	1	.8
770 Warehousemen, n.e.c.							1	.8
418 Warehousing & storage	1	4.5					1	.8
785 Not specified laborers							7	5.9
068 General contractors, exc. buildings			1	2.0			1	.8
208 Electrical machinery equip. & supplies, n.e.c.			1	2.0			1	.8
268 Meat products			2	4.0			2	1.7
367 Agricultural chemicals	2	9.1					2	1.7
528 Farm products-raw materials					1	2.2	1	.8
801 Farmers (owners & tenants)							9	7.6
017 Agricultural production	1	4.5	5	10.0	3	6.5	9	7.6
822 Farm laborers, wage workers							15	12.7
017 Agricultural production	5	22.7	7	14.0	2	4.3	14	11.9
068 General contractors, except buildings					1	2.2	1	.8
823 Farm laborers, unpaid family workers							2	1.7
017 Agricultural production	1	4.5			1	2.2	2	1.7
962 Guards & watchmen							1	.8
018 Agricultural services, except horticultural			1	2.0			1	.8
TOTAL	22	100.0	50	100.0	46	100.0	118	100.0

TABLE 22

DETAILED OCCUPATION AND INDUSTRY OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE AUTOMOTIVE PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSITITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Occupation/Industry		YEAR OF GRADUATION							
		1969-70		1970-71		1971-72		TOTAL	
		No.	%	No.	%	No.	%	No.	%
025	Foresters and Conservationist							2	.7
	027 Forestry			1	1.1			1	.4
	927 State public administration	1	1.2					1	.4
080	Clinical laboratory technologists and technicians							1	.4
	848 Health service, n.e.c.					1	1.0	1	.4
220	Office managers, n.e.c.							1	.4
	749 Automotive services, exc. repair					1	1.0	1	.4
245	Managers & administrators, n.e.c.							4	1.4
	279 Grain-mill products			1	1.1			1	.4
	648 Gasoline service stations			1	1.1			1	.4
	757 Automobile repair & related services	1	1.2	1	1.1			2	.7
270	Real estate agents & brokers							1	.4
	718 Real estate, incl. real estate-insurance-law offices					1	1.0	1	.4
280	Salesmen & sales clerk, n.e.c.							14	5.0
	068 General contractors, exc. building					1	1.0	1	.4
	639 Motor vehicle dealers	2	2.4	2	2.1	4	3.8	4	2.8
	647 Tire, battery, & accessory dealers			1	1.1	3	2.9	4	1.4
	667 Furniture and home furnishing stores	1	1.2					1	.4
305	Bookkeepers							1	.4
	268 Meat products					1	1.0	1	.4
345	Keypunch operator							1	.4
	739 Computer programming service					1	1.0	1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
374 Shipping & receiving clerks							1	.4
729 Commercial research, development, & testing labs	1	1.2					1	.4
410 Brickmasons & stonemasons, apprentices							1	.4
069 Special trade contractors					1	1.0	1	.4
415 Carpenters							1	.4
067 General building contractors					1	1.0	1	.4
430 Electricians							1	.4
067 General building contractors					1	1.0	1	.4
436 Excavating, grading & road machine operators; exc. bulldozers							1	.4
067 General building contractors					1	1.0	1	.4
436 Excavating, grading & road machine operators; exc. bulldozers							1	.4
068 General contractors, exc. building	1	1.2					1	.4
441 Foreman, n.e.c.							1	.4
019 Glass & glass products					1	1.0	1	.4
461 Machinist							3	1.1
187 Metalworking machinery					1	1.0	1	.4
227 Aircraft and parts					1	1.0	1	.4
639 Motor vehicle dealers	1	1.2					1	.4
473 Automobile mechanics							157	55.9
068 General contractors, exc. building					2	1.9	2	.7
069 Special Trade contractors	1	1.2					1	.4
147 Other primary iron & steel industries	1	1.2					1	.4
178 Farm machinery & equip.			1	1.1			1	.4
219 Motor vehicle & motor vehicle equipment			1	1.1			1	.4
238 Cycles & misc. transportation equipment					1	1.0	1	.4
289 Beverage industry			1	1.1			1	.4
408 Street railway & bus line	1	1.2					1	.4
417 Trucking service					1	1.0	1	.4

Occupation/Industry			YEAR OF GRADUATION							
			1969-70		1970-71		1971-72		TOTAL	
			No.	%	No.	%	No.	%	No.	%
	587	Wholesalers, n.e.c.					1	1.0	1	.4
	639	Motor vehicle dealers	25	30.1	23	24.5	20	19.2	68	24.2
	647	Tire, battery, & accessory dealers					3	2.9	3	1.1
	649	Misc. vehicle dealers					1	1.0	1	.4
	749	Automotive services, exc. repair					1	1.0	1	.4
	757	Automobile repair and related services	17	20.5	30	31.9	20	19.2	67	23.8
	759	Misc. repair services	1	1.2					1	.4
	828	Offices of physicians			1	1.1			1	.4
	858	Colleges & universities			1	1.1	3	2.9	4	1.4
480		Farm implement							1	.4
	178	Farm machinery & equip.	1	1.2					1	.4
481		Heavy equipment mechanic, inc. diesel							4	1.8
	068	General contractors, exc. building	1	1.2					1	.4
	219	Motor vehicles & motor vehicle equipment					1	1.0	1	.4
	279	Grain-mill products	1	1.2					1	.4
	757	Automobile repair and related services	1	1.2					1	.4
	927	State public administration			1	1.1			1	.4
482		Household appliance & accessory installers & mechanics							1	.4
	197	Machinery, exc. electrical n.e.c.			1	1.1			1	.4
492		Misc. mechanic & repairmen							1	.4
	228	Ship & boat building and repair					1	1.0	1	.4
495		Not specified mechanics and repairmen							1	.4
	278	Canning and preserving fruits, vegetables, & sea foods					1	1.0	1	.4
502		Millwrights							1	.4
	147	Other primary iron & steel industries					1	1.0	1	.4
530		Pressmen & plat printers, printing							2	.7
	339	Printing, publishing and allied industries, exc. newspaper					2	1.9	2	.7

Occupation/Industry	YEAR OF GRADUATION 1969-70 No.	%	1970-71 No.	%	1971-72 No.	%	TOTAL No.	%
534 Roofers and slaters							1	.4
067 General building contractors					1	1.0	1	.4
563 Upholsterers							1	.4
317 Yarn, thread, and fabric mills			1	1.0			1	.4
575 Craftsmen & Kindred workers, n.e.c.							1	.4
237 Mobile dwellings & campers			1	1.0			1	.4
602 Assemblers							1	.4
228 Ship & boat building and repairing			1	1.0			1	.4
604 Bottling & canning operatives							1	.4
278 Canning & preserving fruits vegetables & sea foods			1	1.0			1	.4
610 Checkers, examiners & inspectors, manufacturing							1	.4
247 Optical & health service supplies					1	1.0	1	.4
614 Drillers, earth							1	.4
049 Crude petroleum & natural gas extractions					1	1.0	1	.4
622 Furnacemen, smeltermen & pourers							1	.4
147 Other primary iron & steel industries	1	1.2					1	.4
623 Garage workers & gas station attendants							6	2.1
639 Motor vehicle dealers	1	1.2	1	1.1			2	.7
648 Gasoline service stations	2	2.4			2	1.9	4	1.4
651 Grinding machine operative							1	.4
187 Metalworking machinery	1	1.2					1	.4
653 Precision machine operatives, n.e.c.							2	.7
197 Machinery, except electrical, n.e.c.	1	1.2			1	1.0	2	.7

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
656 Punch & stamping press operatives							1	.4
197 Machinery, exc. electrical, n.e.c.					1	1.0	1	.4
662 Sawyers							1	.4
158 Fabricated structural metal products					1	1.0	1	.4
680 Welders & flame-cutters							3	1.1
017 Agricultural production	1	1.2					1	.4
559 Scrap and waste materials			1	1.1			1	.4
759 Misc. repair services			1	1.1			1	.4
690 Machine operatives, misc. specified							1	.4
268 Meat products					1	1.0	1	.4
695 Not specified operatives							1	.4
069 Special trade contractors	1	1.2					1	.4
703 Busdrivers							3	1.1
408 Street railway & bus lines	1	1.2	1	1.1	1	1.0	3	1.1
705 Deliverymen & routemen							1	.4
639 Motor vehicle dealers			1	1.1			1	.4
706 Forklift & tow motor operatives							1	.4
168 Misc. fabricated metal products					1	1.0	1	.4
712 Railroad brakemen							1	.4
407 Railroads & railway express service			1	1.1			1	.4
715 Truck drivers							10	3.6
019 Horticultural service	1	1.2					1	.4
278 Canning & preserving fruits, vegetables, and sea foods	1	1.2					1	.4
417 Trucking service	1	1.2	1	1.1	1	1.0	3	1.1
528 Farm products-raw materials	1	1.2					1	.4
639 Motor vehicle dealers			1	1.1			1	.4
647 Tire, battery, & accessory dealers					1	1.0	1	.4
648 Gasoline service stations					1	1.0	1	.4
679 Farm & garden supply stores	1	1.2					1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
751 Construction laborers, except carpenters' helpers							5	1.8
067 General building contractors	1	1.2	2	2.1	1	1.0	4	1.4
069 Special trade contractors	1	1.2					1	.4
761 Lumbermen, raftsmen & wood choppers							1	.4
107 Logging	1	1.2					1	.4
762 Stockhandlers							4	1.4
269 Dairy products			1	1.1			1	.4
628 Grocery stores	1	1.2			1	1.0	2	.7
647 Tire, battery, & accessory dealers	1	1.2					1	.4
785 Not specified laborers							8	2.8
077 Not specified construction	1	1.2					1	.4
147 Other primary iron & steel industries					1	1.0	1	.4
268 Meat products					1	1.0	1	.4
269 Dairy products	1	1.2					1	.4
398 Not specified manufacturing industries	1	1.2					1	.4
407 Railroads & railway express service			1	1.1			1	.4
469 Gas & steam supply systems					1	1.0	1	.4
607 Lumber & building material retailing	1	1.2					1	.4
801 Farmers (owners & tenants)							8	2.8
017 Agricultural production			4	4.3	4	3.8	8	2.8
802 Farm managers							1	.4
017 Agricultural production					1	1.0	1	.4
822 Farm laborers, wage workers							6	2.1
017 Agricultural production	2	2.4	3	3.2	1	1.0	6	2.1
903 Janitor & sextons							3	1.1
139 Blast furnaces, steel works, rolling & finishing mills			1	1.1			1	.4
278 Canning & preserving fruits, vegetables, and sea foods			1	1.1			1	.4
858 Colleges & universities			1	1.1			1	.4
964 Policemen & detectives							1	.4
937 Local public administration			1	1.1			1	.4
TOTAL	83	100.0	94	100.0	104	100.0	281	100.0

TABLE 23

DETAILED OCCUPATION AND INDUSTRY OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE CHEFS, COOKS, AND FOOD PREPARATION PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Occupation/Industry			YEAR OF GRADUATION 1969-70		1970-71		1971-72		TOTAL	
			No.	%	No.	%	No.	%	No.	%
074		Dietitians							1	.4
	838	Hospitals	1	1.3					1	.4
150		Agriculture & biological technicians, exc. health							1	.4
	268	Meat products					1	1.2	1	.4
185		Musicians & composers							1	.4
	807	Theaters & motion pictures					1	1.2	1	.4
230		Restaurant, cafeteria, and bar managers							17	7.4
	669	Eating & drinking places	4	5.1	6	8.8	6	7.4	16	7.0
	809	Misc. entertainment and recreation services							1	.4
245		Managers & administrators, n.e.c.							20	8.9
	278	Canning & preserving fruits, vegetables, & sea foods					1	1.2	1	.4
	628	Grocery stores			1	1.5			1	.4
	637	Retail bakeries					1	1.2	1	.4
	669	Eating & drinking places	3	3.8					3	1.3
280		Salesmen & sales clerks, n.e.c.							7	3.1
	609	Department & mail order establishments			1	1.5			1	.4
	637	Retail bakeries	1	1.3					1	.4
	639	Motor vehicle dealers					1	1.2	1	.4
	647	Tire, battery, & accessory dealers			1	1.5			1	.4
	669	Eating & drinking places	1	1.3	1	1.5			2	.9
	748	Business services, n.e.c.			1	1.5			1	.4
305		Bookkeepers							2	.9
	539	Machinery equipment & supplies					1	1.2	1	.4
	777	Hotels & motels	1	1.3					1	.4

Occupation/Industry		YEAR OF GRADUATION							
		1969-70		1970-71		1971-72		TOTAL	
		No.	%	No.	%	No.	%	No.	%
375	Statistical Clerks							2	.9
717	Insurance					1	1.2	1	.4
839	Convalescent institutions			1	1.5			1	.4
381	Stock clerk & storekeepers							1	.4
858	Colleges & universities					1	1.2	1	.4
391	Typist							1	.4
927	State public administration			1	1.5			1	.4
402	Bakers							9	3.9
609	Department & mail order establishments	1	1.3					1	.4
628	Grocery stores			3	4.4			3	1.3
637	Retail bakeries			2	2.9			2	.9
669	Eating & drinking places			1	1.5	1	1.2	2	.9
838	Hospitals			1	1.5			1	.4
430	Electricians							1	.4
069	Special trade contractors					1	1.2	1	.4
473	Automobile mechanics							1	.4
639	Motor vehicle dealers			1	1.5			1	.4
492	Misc. mechanics & repairmen							1	.4
668	Household appliances, T.V., and radio stores			1	1.5			1	.4
602	Assemblers							2	.9
398	Not specified manufacturing industries			2	2.9			2	.9
604	Bottling & canning operatives							1	.4
278	Canning & preserving fruits, vegetables, & sea foods	1	1.3					1	.4
612	Cutting operatives, n.e.c.							1	.4
268	Meat products					1	1.2	1	.4
623	Garage workers & gas station attendants							1	.4
648	Gasoline service stations	1	1.3					1	.4
631	Meat cutters & butchers, except manufacturing							1	.4
628	Grocery stores	1	1.3					1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
680 Welders & flame-cutters							1	.4
219 Motor vehicles and motor vehicle equipment					1	1.2	1	.4
690 Machine operatives, misc. specified							1	.4
068 General contractors, except building	1	1.3					1	.4
694 Miscellaneous operatives							1	.4
427 Air transportation					1	1.2	1	.4
695 Not specified operatives							3	1.3
637 Retail bakeries	2	2.6			1	1.2	3	1.3
751 Construction laborers, except carpenters' helpers							2	.9
069 Special trade contractors	1	1.3	1	1.5			2	.9
753 Freight & material handlers							1	.4
259 Misc. manufacturing ind.	1	1.3					1	.4
762 Stock handlers							1	.4
628 Grocery stores					1	1.2	1	.4
770 Warehousemen, n.e.c.							1	.4
857 Elementary & secondary schools	1	1.3					1	.4
785 Not specified laborers							9	3.9
017 Agricultural production			1	1.5			1	.4
018 Agricultural services, except horticultural			1	1.5			1	.4
049 Crude petroleum & natural gas extractions	1	1.3					1	.4
168 Misc. fabricated metal products	1	1.3					1	.4
179 Construction & material handling machines	1	1.3					1	.4
269 Dairy products	1	1.3					1	.4
279 Grain-mill products					1	1.2	1	.4
398 Not specified manufacturing industries	1	1.3					1	.4
759 Misc. repair services					1	1.2	1	.4

Occupation/Indusry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
822 Farm laborers, wage workers							2	.9
017 Agricultural production	1	1.3			1	1.2	2	.9
903 Janitors & sextons							3	1.3
609 Department & mail order establishments	2	2.6					2	.9
779 Laundering, cleaning, and other garment services			1	1.5			1	.4
912 Cooks, except private household							115	50.7
269 Dairy products	1	1.3					1	.4
669 Eating & drinking places	18	23.1	20	29.4	20	24.7	58	25.6
777 Hotels & motels	6	7.7	7	10.3	20	24.7	33	14.5
778 Lodging places, except hotels & motels	1	1.3					1	.4
809 Misc. entertainment & recreation services	3	3.8	1	1.5	4	4.9	8	3.5
838 Hospitals	3	3.8	1	1.5	1	1.2	5	2.2
839 Convalescent institutions	1	1.3			2	2.5	3	1.3
858 Colleges & universities			1	1.5	1	1.2	2	.9
887 Nonprofit membership organizations	1	1.3	1	1.2			2	.9
917 Federal public administration					1	1.2	1	.4
927 State public administration			1	1.5			1	.4
913 Dishwashers							3	1.3
668 Household appliances, T.V., and radio stores	1	1.3					1	.4
669 Eating & drinking places			1	1.5			1	.4
777 Hotels & motels			1	1.5			1	.4
914 Food counter & fountain workers							2	.9
609 Department & mail order establishments	1	1.3					1	.4
669 Eating and drinking places	1	1.3					1	.4
915 Waiters							2	.9
669 Eating and drinking places			2	2.9			2	.9
916 Food service workers, n.e.c. except private household							17	7.4
669 Eating & drinking places	1	1.3	1	1.5			2	.9
777 Hotels & motels					1	1.2	1	.4
838 Hospitals	4	5.1	1	1.5	2	2.5	7	3.1
839 Convalescent institutions	2	2.6			1	1.2	3	1.3
848 Health services, n.e.c.	1	1.3					1	.4
858 Colleges & Universities					2	2.5	2	.9
917 Federal public administration					1	1.2	1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
922 Health aides, except nursing							5	2.2
838 Hospitals	3	3.8	1	1.5			4	1.8
848 Health services, n.e.c.	1	1.3					1	.4
925 Nursing aides, orderlies and attendants							1	.4
838 Hospitals			1	1.5			1	.4
TOTAL	78	100.0	68	100.0	81	100.0	227	100.0

TABLE 24

DETAILED OCCUPATION AND INDUSTRY OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE CLERICAL TRAINING PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Occupation/Industry		YEAR OF GRADUATION							
		1969-70		1970-71		1971-72		TOTAL	
		No.	%	No.	%	No.	%	No.	%
202	Bank officers & financial managers							1	.3
	787 Beauty shops					1	1.0	1	.3
205	Buyers, wholesalers & retail trade							1	.3
	609 Department and mail order establishments			1	1.1			1	.3
265	Insurance agents, brokers & underwriters							2	.7
	717 Insurance	1	1.0	1	1.1			2	.7
280	Salesmen & sales clerks, n.e.c.							12	4.1
	609 Department & mail order establishments	2	2.0	1	1.1	1	1.0	4	1.4
	628 Grocery stores					1	1.0	1	.3
	668 Household appliance, T.V., and radio stores			1	1.1			1	.3
	687 Jewelry stores					1	1.0	1	.3
	689 Retail stores					1	1.0	1	.3
	717 Insurance	1	1.0			1	1.0	2	.7
	777 Hotels & motels			1	1.1			1	.3
	838 Hospitals					1	1.0	1	.3
301	Banktellers							8	2.7
	707 Banking			3	3.4	5	4.8	8	2.7
305	Bookkeepers							25	8.6
	238 Cycles & misc. transportation equipment	1	1.0					1	.3
	269 Dairy products					1	1.0	1	.3
	338 Newspaper publishing & printing	1	1.0					1	.3
	418 Warehousing & storage			1	1.1			1	.3
	607 Lumber & building materials retailing	1	1.0					1	.3
	608 Hardware & farm equipment			1	1.1			1	.3
	639 Motor vehicle dealers	2	2.0					2	.7
	707 Banking	4	4.0	2	2.3	3	2.9	9	3.1
	717 Insurance	1	1.0			1	1.0	2	.7

Occupation/Industry	YEAR OF GRADUATION 1969-70 No.	 %	 1970-71 No.	 %	 1971-72 No.	 %	 TOTAL No.	 %
748 Business services, n.e.c.			1	1.1			1	.3
779 Laundering, cleaning & other garment services	1	1.1					1	.3
857 Elementary & secondary school			1	1.1			1	.3
897 Misc. professional & related services					1	1.0	1	.3
927 State public administration					1	1.0	1	.3
937 Local public administration	1	1.0					1	.3
310 Cashiers							4	1.4
609 Department & mail order establishments					1	1.0	1	.3
628 Grocery stores			1	1.1			1	.3
907 Postal service					1	1.0	1	.3
937 Local public administration	1	1.0					1	.3
312 Clerical supervisors, n.e.c.							1	.3
448 Telephone (wire & radio)					1	1.0	1	.3
314 Counter clerks, except food							4	1.4
398 Not specified manufacturing industries					1	1.0	1	.3
779 Laundering, cleaning, & other garment services	1	1.0	1	1.1			2	.7
809 Misc. entertainment & recreation services	1	1.0					1	.3
321 Estimators & investigators, n.e.c.							1	.3
717 Insurance					1	1.0	1	.3
325 File clerks							4	1.4
707 Banking			1	1.0			1	.3
717 Insurance	1	1.0	1	1.1			2	.7
828 Office of physicians					1	1.0	1	.3
326 Insurance adjusters, examiners & investigators							1	.3
717 Insurance	1	1.0					1	.3
332 Mailhandlers, exc. post office							2	.7
279 Grain-mill products			1	1.1			1	.3
697 Misc. retail stores	1	1.0					1	.3
341 Bookkeeping & billing machine operators							1	.3
609 Department & mail order establishments	1	1.0					1	.3

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
342 Calculating machine operators							1	.3
339 Printing, publishing, & allied industries, except newspaper	1	1.0					1	.3
343 Computer & peripheral equipment operators							3	1.0
329 Misc. paper & pulp products					1	1.0	1	.3
607 Lumber & building materials retailing			1	1.1			1	.3
838 Hospitals	1	1.0					1	.3
344 Duplicating machine operators							1	.3
828 Office of physicians			1	1.1			1	.3
345 Keypunch operators							12	4.1
359 Paints, varnishes, & related products	1	1.0					1	.3
609 Department & mail order establishments			1	1.1			1	.3
679 Liquor stores			1	1.1			1	.3
688 Fuel & ice dealers					1	1.0	1	.3
707 Banking			1	1.1			1	.3
708 Credit agencies			1	1.1			1	.3
717 Insurance	1	1.0					1	.3
739 Computer programing services	1	1.0	1	1.1	1	1.0	3	1.0
749 Automobile services, except repair					1	1.0	1	.3
838 Hospitals					1	1.0	1	.3
355 Office machine operators, n.e.c.							1	.3
067 General building contractors					1	1.0	1	.3
360 Payroll & timekeeping clerks							2	.7
707 Banking	2	2.0					2	.7
364 Receptionist							1	.3
829 Office of dentists					1	1.0	1	.3
370 Secretaries, legal							1	.3
849 Legal services					1	1.0	1	.3
371 Secretaries, medical							1	.3
329 Misc. paper & pulp products					1	1.0	1	.3

	Occupation/Industry	YEAR OF GRADUATION							
		1969-70		1970-71		1971-72		TOTAL	
		No.	%	No.	%	No.	%	No.	%
372	Secretaries, n.e.c.							46	15.8
168	Misc. fabricated metal products					1	1.0	1	.3
187	Metalworking machinery					1	1.0	1	.3
209	Not specified electrical machinery, equipment & supplies					1	1.0	1	.3
238	Cycles & misc. transportation equipment					1	1.0	1	.3
279	Grain mill products					1	1.0	1	.3
328	Pulp, paper & paperboard mills	1	1.0					1	.3
338	Newspaper publishing & printing			1	1.1	1	1.0	2	.7
398	Not specified manufacturing industries			1	1.1			1	.3
417	Trucking services			1	1.1			1	.3
427	Air transportation					1	1.0	1	.3
447	Radio broadcasting & T.V.	1	1.0					1	.3
697	Misc. retail stores			2	2.3			2	.7
707	Banking	1	1.0			2	1.9	3	1.0
708	Credit agencies	1	1.0			1	1.0	2	.7
717	Insurance	2	2.0	1	1.1	2	1.9	5	1.7
718	Real estate, incl. real estate-insurance-law offices			1	1.1			1	.3
727	Advertising					1	1.0	1	.3
748	Business services, n.e.c.	1	1.0					1	.3
828	Offices of physicians			1	1.1	1	1.0	2	.7
838	Hospitals			1	1.1			1	.3
839	Convalescent institutions	1	1.0			1	1.0	2	.7
848	Health services, n.e.c.	1	1.0					1	.3
857	Elementary & secondary schools	1	1.0	1	1.1	2	1.9	4	1.4
858	College & universities	1	1.0			2	1.9	3	1.0
889	Accounting, auditing & bookkeeping services			1	1.1	1	1.9	2	.7
927	State public administration	1	1.0			2	1.9	3	1.0
937	Local public administration			1	1.1			1	.3
374	Shipping & receiving clerks							1	.3
707	Banking	1	1.0					1	.3
375	Statistical clerks							2	.7
717	Insurance	1	1.0					1	.3
917	Federal public administration	1	1.0					1	.3
376	Stenographers							5	1.7
398	Not specified manufacturing industries	1	1.0					1	.3

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
707 Banking	1	1.0					1	.3
717 Insurance			1	1.1			1	.3
917 Federal public administration			1	1.1			1	.3
937 Local public administration					1	1.0	1	.3
381 Stock clerk & storekeepers							1	.3
539 Machinery equipment and supplies	1	1.0					1	.3
382 Teacher aides, except school monitors							3	1.0
857 Elementary & seceondary schools	1	1.0	2	2.3			3	1.0
385 Telephone operators							2	.7
448 Telephone (wire & radio)	1	1.0					1	.3
917 Federal public administration					1	1.0	1	.3
391 Typists							90	32.4
067 General building contractors	1	1.0					1	.3
068 General contractors, except building	1	1.0					1	.3
157 Cutley, hand tools & other hardware					1	1.0	1	.3
187 Metalworking machinery			1	1.1			1	.3
197 Machinery, except electrical, n.e.c.					1	1.0	1	.3
258 Ordnance			1	1.1			1	.3
259 Misc. manufacturing ind.			3	3.4			3	1.0
337 Paperboard containers & boxes					1	1.0	1	.3
338 Newspaper publishing & printing	1	1.0			1	1.0	2	.7
339 Printing, publishing & allied industries except newspaper	2	2.0			1	1.0	3	1.0
377 Petroleum refining					1	1.0	1	.3
398 Not specified manufacturing industries								
448 Telephone (wire & radio)	3	3.0			1	1.0	4	1.8
467 Electric light & power	1	1.0					1	.3
468 Electric-gas utilities			1	1.1			1	.3
469 Gas & steam supply systems	1	1.0			1	1.0	2	.7
568 Paper & its products	1	1.0					1	.3
588 Not specified wholesale trade								

Occupation/Industry		YEAR OF GRADUATION							
		1969-70		1970-71		1971-72		TOTAL	
		No.	%	No.	%	No.	%	No.	%
	609 Department & mail order establishments	2	2.0	1	1.1			3	1.0
	697 Misc. retail stores			1	1.1			1	.3
	707 Banking					1	1.0	1	.3
	708 Credit agencies			1	1.1	1	1.0	2	.7
	709 Security, commodity brokerage & investment companies					1	1.0	1	.3
	717 Insurance			1	1.1	5	4.8	6	2.1
	739 Computer programing services			1	1.1			1	.3
	807 Theaters & motion pictures					1	1.0	1	.3
	828 Offices of physicians			1	1.1			1	.3
	838 Hospitals	2	2.0	3	3.4			5	1.7
	839 Convalescent institutions	1	1.0					1	.3
	848 Health services, n.e.c.					1	1.0	1	.3
	849 Legal services	1	1.0					1	.3
	857 Elementary & secondary schools			1	1.1			1	.3
	858 Colleges & universities	7	7.1	3	3.4	4	3.8	14	4.8
	917 Federal public administration	2	2.0	1	1.1			3	1.0
	927 State public administration	8	8.1	1	1.1	5	4.8	14	4.8
	937 Local public administration			1	1.1	1	1.0	2	.3
392	Weighers							1	.3
	828 Offices of physicians			1	1.1			1	.3
394	Misc. clerical workers							4	1.8
	828 Offices of physicians					1	1.0	1	.3
	838 Hospitals	1	1.0					1	.3
	917 Federal public administration			1	1.1			1	.3
	937 Local public administration			1	1.1			1	.3
395	Not specified clerical workers							2	.7
	609 Department & mail order establishments	1	1.0					1	.3
	628 Grocery stores	1	1.0					1	.3
525	Power station operators							1	.3
	838 Hospitals	1	1.0					1	.3
602	Assemblers							6	2.1
	189 Electronic computing equipment			2	2.3			2	.1
	208 Electric machinery, equip., and supplies, n.e.c.					1	1.0	1	.3
	258 Ordnance			1	1.1			1	.3
	398 Not specified manufacturing industries	1	1.0			1	1.0	2	.7

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
610 Checkers, examiners & inspectors; manufacturing							1	.3
278 Canning & preserving fruits vegetables, & sea foods			1	1.1			1	.3
613 Dressmakers & seamstress, except factory							1	.3
319 Apparel & accessories					1	1.0	1	.3
630 Laundry & dry cleaning operatives, n.e.c.							1	.3
839 Convalescent institutions	1	1.0					1	.3
643 Packers & wrappers, except meat products							2	.7
268 Meat products	1	1.0					1	.3
697 Misc. retail stores	1	1.0					1	.3
644 Painters, manufactured articles							1	.3
398 Not specified manufacturing industries					1	1.0	1	.3
662 Sawyers							1	.3
158 Fabricated structural metal products	1	1.0					1	.3
663 Sewers & stitchers							1	.3
307 Knitting mills			1	1.1			1	.3
681 Winding operatives, n.e.c.							2	.7
398 Not specified manufacturing industries	2	2.0					2	.7
762 Stock handlers							1	.3
657 Apparel & accessories stores, exc. shoe stores					1	1.0	1	.3
785 Not specified laborers							2	.7
278 Canning & preserving fruits vegetables & sea foods					1	1.0	1	.3
289 Beverage industries					1	1.0	1	.3
821 Farm foremen							1	.3
017 Agricultural production	1	1.0					1	.3

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
822 Farm laborers, wage workers							2	.7
017 Agricultural production			1	1.1	1	1.0	2	.7
901 Chambermaids & maids, except private households							1	.3
777 Hotels & motels					1	1.0	1	.3
915 Waiters							5	1.7
669 Eating & drinking places	1	1.0	3	3.4	1	1.0	5	1.7
925 Nursing aides, orderlies & attendants							9	3.1
828 Offices of physicians	1	1.0					1	.3
838 Hospitals	1	1.0	2	2.3			3	1.0
839 Convalescent institutions			3	3.4	2	1.9	5	1.7
926 Practical nurses							1	.3
838 Hospitals					1	1.0	1	.3
980 Child care workers, private household							1	.3
769 Private households			1	1.1			1	.3
984 Maids & Servants, private households							1	.3
769 Private households			1	1.1			1	.3
TOTAL	99	100.0	88	100.0	104	100.0	291	100.0

TABLE 25

DETAILED OCCUPATION AND INDUSTRY OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE ELECTRONICS PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
003 Computer Programmer							1	.4
339 Printing, publishing and allied industries exc. newspapers					1		1	.4
012 Electrical & Electronic Engineers							9	3.3
447 Radio Broadcasting & T.V.	2	2.5	2	2.2	1	1.0	5	1.8
448 Telephone (wire and radio)			1	1.1			1	.4
467 Electric light and power	1	1.2					1	.4
080 Clinical laboratory technologist and technician							1	.4
838 Hospitals					1	1.1	1	.4
152 Draftsmen							1	.4
467 Electric light and power					1	1.0	1	.4
153 Electrical & Electronics engineering technicians							81	29.7
068 General contractors, exc. building					1	1.0	1	.4
168 Misc. fabricated metal prod.					1	1.0	1	.4
188 Office & accounting machines					2	2.0	2	.7
197 Machinery, exc. electrical, n.e.c.					1	1.0	1	.4
207 Radio, T.V., & communications equipment	2	2.5					2	.7
208 Electrical machinery, equipment, & supplies, n.e.c.	5	7.4	9	10.0	6	5.9	21	7.7
247 Optical & health services supplies					1	1.0	1	.4
268 Meat products			1	1.1			1	.4
398 Not specified manufacturing industrial	1	1.2	2	2.2	2	2.0	5	1.8
448 Telephone (wire & radio)					1	1.0	1	.4
539 Machinery equipment & supplies		1	1.1				1	.4
608 Hardware & farm equip. stores					2	2.0	2	2.7

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
609 Department and mail order establishments			1	1.1	1	1.0	2	.7
668 Household appliances, T.V. and radio stores	1	1.2	2	2.2			3	1.1
697 Misc. retail stores			1	1.1			1	.4
709 Security, commodity brokerage, & investment companies			1	1.1			1	.4
739 Computer programming service	5	6.2	5	5.6	19	18.6	29	10.6
758 Electrical repair shops			3	3.3	1	1.0	4	1.5
838 Hospitals			1	1.1			1	.4
858 Colleges & universities					1	1.0	1	.4
158 Fabricated structural metal products							1	.4
739 Computer programming services					1	1.0	1	.4
162 Engineering & Science Technicians, n.e.c.							4	1.5
347 Industrial chemicals			2	2.2			2	.7
398 Not specified manufacturing industries	2	2.5					2	.7
230 Restaurant, cafeteria, & bar managers							1	.4
669 Eating & drinking places			1	1.1			1	.4
245 Managers & administrators, n.e.c.							8	2.9
628 Grocery stores	1	1.2	2	2.2			3	1.1
668 Household appliance, T.V., and radio stores			3	3.3	1	1.0	4	1.5
757 Automobile repair and related services	1	1.2					1	.4
280 Salesmen & sales clerks, n.e.c.							4	1.5
639 Motor vehicle dealers			1	1.1			1	.4
668 Household appliance, T.V. and radio stores	1	1.2	1	1.1	1	1.0	3	1.1
361 Postal Clerk							1	.4
907 Postal service	1	1.2					1	.4
374 Shipping and receiving clerk							2	.7
337 Printing, publishing & allied industries					1	1.0	1	.4
417 Trucking service	1	1.2					1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
391 Typists							1	.4
858 Colleges & universities			1	1.1			1	.4
392 Weighers							1	.4
268 Meat products			1	1.1			1	.4
415 Carpenters							1	.4
069 Special trade contractors	1	1.2					1	.4
430 Electricians							6	2.2
047 Metal mining	1	1.2					1	.4
069 Special trade contractors					1	1.0	1	.4
147 Other primary metal and steel industries	1	1.2					1	.4
298 Not specified food ind.	1	1.2					1	.4
398 Not specified manufacturing industries	1	1.2					1	.4
467 Electric light and power	1	1.2					1	.4
433 Electric power linemen and cablemen							1	.4
467 Electric light and power					1	1.0	1	.4
435 Engravers, except photoengravers							1	.4
687 Jewelry stores	1	1.2					1	.4
441 Foremen, n.e.c.							3	1.1
208 Electrical machinery, equipment and supplies, n.e.c.	1	1.2					1	.4
209 Not specified electrical machinery, equipment & supplies	1	1.2					1	.4
377 Petroleum refining					1	1.0	1	.4
445 Glaziers							1	.4
119 Glass & glass products			1	1.1			1	.4
452 Inspectors, n.e.c.							1	.4
139 Blast furnace, steel works, rolling & finishing mills			1	1.1			1	.4
454 Job and die setters metal							1	.4
219 Motor vehicle & motor vehicle equipment					1	1.0	1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
473 Automobile mechanics							1	.4
757 Automobile repair and related services					1	1.0	1	.4
475 Data processing machine repairman							1	.4
739 Computer programming service	1	1.2					1	.4
484 Office machine							1	.4
188 Office & accounting machines	1	1.2					1	.4
485 Radio and television							25	9.2
068 General contractor, except building					1	1.0	1	.4
208 Electrical machinery, equip., & supplies, n.e.c.					1	1.0	1	.4
609 Department and mail order establishments	1	1.2					1	.4
668 Household appliances, T.V., and radio stores	5	6.2	6	6.7	9	8.8	20	7.3
758 Electrical repair shop	1	1.2					1	.4
858 Colleges & universities					1	1.0	1	.4
492 Misc. mechanics & repairmen							13	4.8
047 Metal mining					1	1.0	1	.4
609 Department & mail order establishments					1	1.0	1	.4
668 Household appliances, T.V., & radio stores					1	1.0	1	.4
758 Electrical repair shops	3	3.7	4	4.4	3	2.9	10	3.7
495 Not specified mechanics and repairmen							1	.4
398 Not specified manufacturing industries					1	1.0	1	.4
502 Millwrights							1	.4
328 Pulp, paper, and paperboard mills			1	1.1			1	.4
515 Photoengravers & lithographers							1	.4
339 Printing, publishing & allied industries except newspaper					1	1.0	1	.4
545 Stationary engineers							1	.4
478 Sanitary services					1	1.0	1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
552 Telephone installers & repairmen							31	11.4
448 Telephone (wire & radio)	16	19.8	11	12.2	3	2.9	30	11.0
848 Health services, n.e.c.			1	1.0			1	.4
554 Telephone linemen and splicers							2	.7
448 Telephone (wire & radio)	1	1.2			1	1.0	2	.7
602 Assemblers							7	2.6
187 Metalworking machinery			3	3.3			3	1.1
189 Electronic computing equipment					1	1.0	1	.4
228 Ship & Boat building and repairing	1	1.2					1	.4
238 Cycles & misc. transportation equipment			1	1.1			1	.4
888 Engineering & architectural services	1	1.2					1	.4
610 Checkers, examiners, & inspectors manufacturing							3	1.1
177 Engines and turbines					1	1.0	1	.4
208 Electrical machinery, equipment & supplies	1	1.2			1	1.0	2	.7
623 Garage workers & gas station attendants							7	2.6
639 Motor vehicle dealers	1	1.2					1	.4
648 Gasoline service station			4	4.4	2	2.0	6	2.2
640 Mine operatives, n.e.c.							2	.7
047 Metal mining	1	1.2			1	1.0	2	.7
643 Packers & wrappers except meat produce							1	.4
298 Not specified food ind.			1	1.0			1	.4
651 Grinding machine operatives							1	.4
147 Other primary iron & steel industries	1	1.2					1	.4
653 Precision machine operatives, n.e.c.							1	.4
197 Machinery, except electrical, n.e.c.	1	1.2					1	.4

	Occupation/Industry	YEAR OF GRADUATION							
		1969-70		1970-71		1971-72		TOTAL	
		No.	%	No.	%	No.	%	No.	%
656	Punch and stamping press operatives							2	.7
197	Machinery except electrical, n.e.c.			1	1.1			1	.4
199	Household appliances					1	1.0	1	.4
662	Sawyers							1	.4
108	Sawmills, planing mills, and mill work					1	1.0	1	.4
680	Welders and flame-cutters							2	.7
398	Not specified manufacturing industries					1	1.0	1	.4
407	Railroad & railway express service	1	1.2					1	.4
690	Machine operatives, misc. specified							4	1.5
127	Cement, concrete, gypsum & plaster products	1	1.2					1	.4
347	Industrial chemicals			1	1.1			1	.4
379	Rubber products	2	2.5					2	.7
692	Machine operatives, not specified							1	.4
167	Metal stamping					1	1.0	1	.4
694	Miscellaneous operatives							1	.4
339	Printing, publishing, & allied industries, except newspaper			1	1.1			1	.4
695	Not specified operatives							2	.7
289	Beverage industries	1	1.2					1	.4
398	Not specified manufacturing industries					1	1.0	1	.4
703	Bus drivers							1	.4
408	Street railways and bus lines					1	1.0	1	.4
712	Railroad brakemen							1	.4
407	Railroad and railway express service			1	1.1			1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
713 Railroad switchmen							2	.7
407 Railroad and railway express service			1	1.1	1	1.0	2	.7
715 Truck drivers							5	1.8
069 Special trade contractors					1	1.0	1	.4
407 Railroad and railway express service			1	1.1			1	.4
417 Trucking service					1	1.0	1	.4
527 Food related products			1	1.1			1	.4
629 Dairy products stores			1	1.1			1	.4
751 Construction laborers, except carpenters' helpers							2	.7
067 General building contractors					1	1.0	1	.4
069 Special trade contractors			1	1.1			1	.4
753 Freight and material handlers							1	.4
417 Trucking services	1	1.2					1	.4
762 Stock handlers							4	1.5
119 Glass & glass products					1	1.0	1	.4
287 Bakery products					1	1.0	1	.4
628 Grocery stores	1	1.2	1	1.1			2	.7
770 Warehousemen, n.e.c.							2	.7
197 Machinery, except electrical, n.e.c.					2	2.0	2	.7
785 Not specified laborers							2	.7
187 Metalworking machinery					1	1.0	1	.4
268 Meat products	1	1.2					1	.4
801 Farmers (owners and tenants)							4	1.5
017 Agricultural products	2	2.5			2	2.0	4	1.5
802 Framer managers							1	.4
017 Agricultural products	1	1.2					1	.4
822 Farm laborers, wage workers							1	.4
107 Agricultural products			1	1.1			1	.4
903 Janitor and sextons							3	1.1
268 Meat products			1	1.1			1	.4
777 Hotels and motels					1	1.0	1	.4
857 Elementary and secondary schools			1	1.0			1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
925 Nursing aides, orderlies, and attendants							1	.4
838 Hospitals			1	1.1			1	.4
964 Policemen and detectives							1	.4
937 Local public administration					1	1.0	1	.4
TOTAL	81	100.0	90	100.0	102	100.0	273	100.0

TABLE 26

DETAILED OCCUPATION AND INDUSTRY OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE LICENSED PRACTICAL NURSE PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
245 Managers and administrators, n.e.c.							1	.3
657 Apparel and accessories stores, exc. shoe stores					1	1.0	1	.3
301 Bankteller							1	.3
707 Banking			1	.8			1	.3
333 Messengers & office boys							1	.3
717 Insurance	1	.8					1	.3
391 Typists							1	.3
839 Convalescent institutions			1	.8			1	.3
663 Sewers & stitchers							1	.3
797 Dressmaking shops					1	1.0	1	.3
902 Cleaners & charwomen							1	.3
777 Hotels and Motels					1	1.0	1	.3
921 Dental Assistant							2	.6
829 Offices of dentists	1	.8			1	1.0	2	.6
922 Health aides, exc. nursing							1	.3
838 Hospitals	1	.8					1	.3
926 Practical nurses							335	
828 Offices of physicians	3	2.4	6	5.0	3	3.0	12	3.5
838 Hospitals	108	85.7	92	77.3	74	74.0	274	79.4
839 Convalescent institutions	11	8.7	18	15.1	18	18.0	47	13.6
848 Health services, n.e.c.					1	1.0	1	.3
887 Nonprofit membership organizations			1	.8			1	.3
931 Airline stewardesses							1	.3
427 Air transportation	1	.8					1	.3
TOTAL	126	100.0	119	100.0	100	100.0	345	100.0

TABLE 27

DETAILED OCCUPATION AND INDUSTRY OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE MACHINE SHOP PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
085 Health technologist & techncians, n.e.c.							1	.4
838 Hospitals			1	1.1			1	.4
152 Draftsmen							1	.4
739 Computer programming services					1	1.1	1	.4
153 Electrical & electroric engineering, technicians							1	.4
449 Telegraph and misc. communications services			1	1.1			1	.4
161 Surveyors							1	.4
888 Engineering & architectural services					1	1.1	1	.4
173 Technicians							1	.4
739 Computer programming services	1	1.4					1	.4
203 Buyers & shippers, farm products							1	.4
528 Farm products-raw materials	1	1.4					1	.4
245 Managers & administrators, n.e.c.							1	.4
628 Grocery stores			1	1.1			1	.4
280 Salesmen U sales clerks, n.e.c.							5	2.0
158 Fab. structural metal prod.					1	1.1	1	.4
607 Lumber & building material retailing			1	1.1			1	.4
697 Misc. retail stores	1	1.4					1	.4
717 Insurance	1	1.4					1	.4
727 Advertising	1	1.4					1	.4
305 Bookkeepers							1	.4
707 Banking			1	1.1			1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
331 Mail carriers, post office							1	.4
907 Postal services			1	1.1			1	.4
375 Statistical clerks							1	.4
697 Misc. retail stores			1	1.1			1	.4
394 Miscellaneous clerical workers							1	.4
639 Motor vehicles dealers					1	1.1	1	.4
415 Carpenters							2	.8
067 General building contractors					1	1.1	1	.4
069 Special trade contractor					1	1.1	1	.4
424 Cranemen, derrickmen & hoistmen							1	.4
047 Metal mining			1	1.1			1	.4
436 Excavating, grading & road machine operators, exc. bulldozers							3	1.9
067 General building contractors			1	1.1			1	.4
069 Special trade contactors			1	1.1			1	.4
158 Fabricated structural metal products			1	1.1			1	.4
441 Foremen, n.e.c.							3	1.9
067 General building contractors			2	2.2			2	.8
069 Special trade contactors			1	1.1			1	.4
445 Glazier							1	.4
507 Motor vehicle & equip.	1	1.4					1	.4
452 Inspectors, n.e.c.							1	.4
189 Electronic computing equip.			1	1.1			1	.4
461 Machinists							96	37.9
138 Misc. nonmetalic mineral and stone products			1	1.1			1	.4
168 Misc. fabricated metal prod.			1	1.1			1	
187 Metalworking machinery	2	2.9	4	4.4	4	4.3	10	4.0
197 Machinery, exc. electrical	5	7.2	13	14.4	38	40.4	56	22.1
208 Elecrical machinery, equip., and supplies, n.e.c.					1	1.1	1	.4

Occupation/Industry	YEAR OF GRADUATION 1969-70 No.	%	1970-71 No.	%	1971-72 No.	%	TOTAL No.	%
219 Motor vehicle & motor vehicle equipment	1	1.4	1	1.1			2	.8
227 Aircraft and parts	1	1.4					1	.4
238 Cycles & misc. transportation equipment			1	1.1	1	1.1	2	.8
258 Ordnance	15	21.7					15	5.9
339 Printing, publishing & allied industries, exc. newspapers			1	1.1			1	.4
348 Plastics, synthetics & resins, exc. fibers					1	1.1	1	.4
379 Rubber products					1	1.1	1	.4
387 Misc. plastic products					1	1.1	1	.4
398 Not specified manufacturing industries	1	1.4	1	1.1			2	.8
759 Misc. repair services					1	1.1	1	.4
473 Automobile mechanics							3	1.9
639 Motor vehicle dealers					1	1.1	1	.4
757 Automobile repair & related services			1	1.1	1	1.1	2	.8
475 Data processing machine repairmen							1	.4
748 Business services, n.e.c.					1	1.1	1	.4
481 Heavy equipment mechanics, include diesel							6	2.4
187 Metalworking machinery					2	2.1	2	.8
197 Machinery, exc. electrical, n.e.c.					2	2.1	2	.8
398 Not specified manufacturing industries	1	1.4					1	.4
927 State public administration			1	1.1			1	.4
485 Radio and television							1	.4
668 Household appliances, T.V., and radio stores					1	1.1	1	.4
492 Misc. mechanics & repairmen							1	.4
208 Electrical machinery, equip., and supplies, n.e.c.			1	1.1			1	.4
502 Millwrights							1	.4
147 Other primary iron & steel industries					1	1.1	1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
640 Mine operatives, n.e.c.							2	.8
047 Metal mining	2	2.9					2	.8
650 Drill press operatives							1	.4
197 Machinery, exc. electrical					1	1.1	1	.4
651 Grinding machine operatives							4	1.6
187 Metalworking machinery			1	1.1			1	.4
197 Machinery, exc. electrical, n.e.c.	2	2.9					2	.8
258 Ordnance	1	1.4					1	.4
652 Lathe & milling machine operative							10	4.0
069 Special trade contractors	1	1.4					1	.4
187 Metalworking machinery			1	1.1			1	.4
197 Machinery, exc. electrical, n.e.c.	2	2.9	2	2.2	3	3.2	7	2.8
398 Not specified manufacturing industry	1	1.4					1	.4
653 Precision machine operatives, n.e.c.							16	6.3
187 Metalworking machinery	1	1.4					1	.4
197 Machinery, exc. electrical, n.e.c.	2	2.9	5	5.6	3	3.2	10	4.0
208 Electrical machinery, equip., and supplies, n.e.c.			1	1.1			1	.4
238 Cycles & misc. transportation equipment	1	1.4					1	.4
258 Ordnance			1	1.1			2	.7
288 Confectionery & related products			1	1.1			1	.4
656 Punch & stamping press operatives							1	.4
167 Metal stamping			1	1.1			1	.4
680 Welders & flame cutters							3	1.2
197 Machinery, exc. electrical, n.e.c.			1	1.1			1	.4
268 Meat products			1	1.1			1	.4
757 Automobile repair and related services	1	1.4					1	.4
759 Misc. repair services	2	2.9					2	.8

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
503 Molders, metal							3	1.9
187 Metalworking machinery					2	2.1	2	.8
378 Misc. petroleum & coal products			1	1.1			1	.4
506 Optician & lens grinders & polishers							1	.4
247 Optical & health services supplies			1	1.1			1	.4
514 Pattern & model makers, exc. paper							1	.4
197 Machinery, exc. electrical					1	1.1	1	.4
522 Plumbers & pipe fitters							1	.4
069 Special trade contractors	1	1.4					1	.4
561 Tool & die makers							20	8.0
168 Misc. fabricated metal products					1	1.1	1	.4
187 Metalworking machinery	1	1.4	3	3.3	4	4.3	8	3.2
197 Machinery, exc. electrical	1	1.4	1	1.1	1	1.1	3	1.9
219 Motor vehicles & motor vehicle equipment			1	1.1			1	.4
259 Misc. manufacturing industries					2	2.1	2	.8
339 Printing, publishing, and allied industries, exc. newspapers			1	1.1			1	.4
379 Rubber products			1	1.1			1	.4
387 Misc. plastic products	1	1.4	1	1.1			2	.8
398 Not specified manufacturing industries			1	1.1			1	.4
602 Assemblers							3	1.9
158 Fabricated structural metal products	1	1.4					1	.4
198 Not specified machinery	1	1.4					1	.4
258 Ordnance			1	1.1			1	.4
612 Cutting operatives, n.e.c.							1	.4
158 Fabricated structural metal products	1	1.4					1	.4
623 Garage workers & gas station attendants							1	.4
639 Motor vehicle dealers	1	1.4					1	.4

Occupation/Industry	YEAR OF GRADUATION 1969-70 No.	 %	 1970-71 No.	 %	 1971-72 No.	 %	 TOTAL No.	 %
690 Machine operatives, misc. specified							3	1.2
187 Metalworking machinery			1	1.1	1	1.1	2	.8
197 Machinery, exc. electrical, n.e.c.			1	1.1			1	.4
694 Miscellaneous operatives							1	.4
197 Machinery, exc. electrical, n.e.c.	1	1.4					1	.4
695 Not specified operatives							1	.4
077 Not specified construction	1	1.4					1	.4
703 Busdrivers							1	.4
408 Street railways and bus lines			1	1.1			1	.4
706 Fork lift & tow motor operatives							1	.4
279 Grain-mill products	1	1.4					1	.4
715 Truck drivers							8	3.2
067 General building contractors					1	1.1	4	1.6
417 Trucking services			1	1.1			1	.4
527 Food and related products	1	1.4					1	.4
607 Lumber and building materials retailing					1	1.1	1	.4
927 State public administration			1	1.1			1	.4
751 Construction laborers, exc carpenters' helpers							6	2.4
067 General building contractors			3	3.3	1	1.1	4	1.6
068 General contractors, exc. building					1	1.1	1	.4
069 Special trade contractors			1	1.1			1	.4
753 Freight & material handlers							1	.4
418 Warehousing and storage					1	1.1	1	.4
762 Stockhandlers							1	.4
697 Misc. retail storage					1	1.1	1	.4
770 Warehousemen, n.e.c.							1	.4
269 Dairy products			1	1.1			1	.4
780 Miscellaneous laborers							1	.4
047 Metal mining	1	1.4					1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
785 Not specified laborers							10	4.0
047 Metal mining	1	1.4					1	.4
069 Special trade contractors					1	1.1	1	.4
168 Misc. fabricated metal products			1	1.1			1	.4
179 Construction & material handling machines					1	1.1	1	.4
259 Misc. manufacturing industries	1	1.4					1	.4
269 Dairy products			1	1.1			1	.4
398 Not specified manufacturing industries			1	1.1			1	.4
407 Railroads and railway express service					1	1.1	1	.4
757 Automobile repair & related services	1	1.4					1	.4
927 State public administration			1	1.1			1	.4
801 Farmers (owners & tenants)							5	2.0
017 Agricultural production	2	2.9	1	1.1	2	2.1	5	2.0
822 Farm laborers, wage workers							3	1.2
017 Agricultural production	2	2.9	1	1.1			3	1.2
903 Janitors and sextons							5	2.0
167 Metal stamping			1	1.1			1	.4
398 Not specified manufacturing industries			1	1.1			1	.4
697 Misc. retail stores					1	1.1	1	.4
718 Real estates, incl. real estate-insurance-law ofc.					1	1.1	1	.4
838 Hospitals			1	1.1			1	.4
925 Nursing aides, orderlies & attendants							1	.4
838 Hospitals	1	1.4					1	.4
962 Guards & watchmen							1	.4
187 Metalworking machinery			1	1.1			1	.4
TOTAL	69	100.0	90	100.0	94	100.0	253	100.0

TABLE 28

DETAILED OCCUPATION AND INDUSTRY OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE SALES AND BUSINESS MANAGEMENT PROGRAM IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
001 Accountants							1	.4
707 Banking			1	1.0			1	.4
080 Clinical laboratory technologist and technicians							1	.4
828 Offices of physicians			1	1.0			1	.4
202 Bank officers & finanical managers							1	.4
707 Banking					1	1.0	1	.4
205 Buyers, wholesale and retail trade							1	.4
609 Department & mail order establishments	1	2.1			1	1.0	1	.4
210 Credit men							1	.4
667 Furniture & home furnishings stores			1	1.0			1	.4
220 Office managers, n.e.c.							2	.8
609 Department & mail order establishments					1	1.0	2	.8
223 Officials of lodges, societies, and unions							1	.4
887 Nonprofit membership organizations					1	1.0	1	.4
225 Purchasing agents & buyers, n.e.c.							1	.4
657 Apparel & accessories stores, exc. shoe stores	1	2.1					1	.4
230 Resaurant, cafeteria & bar managers							5	2.0
639 Motor vehicle dealers			1	1.0			1	.4
669 Eating & drinking places			3	3.0	1	1.0	4	1.6

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
231 Sales managers & department heads, retail sales							12	4.8
609 Department & mail order establishments	4	8.3	1	1.0	5	4.9	10	4.0
628 Grocery stores			1	1.0			1	.4
639 Motor vehicle dealers			1	1.0			1	.4
240 School administrators, elementary and secondary							1	.4
867 Educational services, n.e.c.					1	1.0	1	.4
245 Managers & administrators, n.e.c.							58	23.1
119 Glass & glass products	1	2.1					1	.4
607 Lumber & building material retailing	1	2.1	1	1.0			2	.8
608 Hardware & farm equipment stores			1	1.0			1	.4
609 Department & mail order establishments	2	4.2	6	5.9	6	5.9	14	5.6
628 Grocery stores	2	4.2	4	4.0	11	10.8	17	6.8
647 Tire, battery, & accessory dealers					2	2.0	2	.8
648 Gasoline service stations			1	1.0	1	1.0	2	.8
657 Apparel & accessories stores, exc. shoe stores			7	6.9	2	2.0	9	3.6
658 Shoe stores	1	2.1	2	2.0			3	1.2
668 Household appliances, T.V. & radio stores					3	2.9	3	1.2
669 Eating & drinking places	1	2.1					1	.4
677 Drug stores			1	1.0			1	.4
678 Liquor stores			1	1.0			1	.4
687 Jewelry stores					1	1.0	1	.4
260 Advertising agents & salesmen							4	1.6
338 Newspaper publishing & printing					3	2.9	3	1.2
657 Apparel & accessories stores, exc. shoe stores			1	1.0			1	.4
270 Real estate agents & brokers							1	.4
718 Real estate, incl. real estate-insurance-law offices					1	1.0	1	.4
280 Salesmen & sales clerks, n.e.c.							69	27.5
067 General building contractor			1	1.0			1	.4
147 Other primary iron & steel industries	1	4.2			1	1.0	3	1.2

Occupation/Industry			YEAR OF GRADUATION							
			1969-70		1970-71		1971-72		TOTAL	
			No.	%	No.	%	No.	%	No.	%
	398	Not specified manufacturing industries			1	1.0			1	.4
	529	Electrical goods					1	1.0	1	.4
	587	Wholesalers, n.e.c.			3	3.0			3	1.2
	607	Lumber & building material retailing	2	4.2	1	1.0	1	1.0	4	1.6
	609	Department & mail order establishments	5	10.4	13	12.9	5	4.9	23	9.2
	628	Grocery stores					2	2.0	2	.8
	638	Food stores, n.e.c.					1	1.0	1	.4
	639	Motor vehicle dealers	1	2.1	1	1.0	5	4.9	7	2.8
	657	Apparel & accessories stores, exc. shoe stores	2	4.2	3	3.0	1	1.0	6	2.4
	658	Shoe stores			4	4.0	1	1.0	5	2.0
	667	Furniture & home furnishings stores			2	2.0	2	2.0	4	1.6
	668	Household appliances, T.V., and radio stores			2	2.0	1	1.0	3	1.2
	679	Farm & garden supply stores					1	1.0	1	.4
	697	Misc. retail stores			1	1.0			1	.4
	738	Business management & consulting services					1	1.0	1	.4
	739	Computer programing services					1	1.0	1	.4
	748	Business services, n.e.c.			1	1.0			1	.4
301		Bank tellers							2	.8
	707	Banking			2	2.0			2	.8
305		Bookkeepers							1	.4
	609	Department & mail order establishments					1	1.0	1	.4
310		Cashiers							3	1.2
	669	Eating & drinking places			1	1.0	2	2.0	3	1.2
312		Clerical supervisors, n.e.c.							1	.4
	917	Federal public administration	1	2.1					1	.4
314		Counter clerks, except food							2	.8
	338	Newspaper publishing & printing	1	2.1					1	.4
	639	Motor vehicle dealers					1	1.0	1	.4
315		Dispatchers & starters, vehicle							1	.4
	417	Trucking services			1	1.0			1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
321 Estimators & investigators, n.e.c.							2	.8
647 Tire, battery, & accessory dealers					1	1.0	1	.4
709 Security, commodity brokerage & investment companies	1	2.1					1	.4
325 File clerk							1	.4
707 Banking			1	1.0			1	.4
360 Payroll & timekeeping clerk							1	.4
268 Meat products			1	1.0			1	.4
364 Receptionist							2	.8
609 Department & mail order establishments					1	1.0	1	.4
708 Credit agencies			1	1.0			1	.4
370 Secretaries, legal							1	.4
849 Legal services			1	1.0			1	.4
374 Shipping & receiving clerks							4	1.6
608 Hardware & farm equipment stores					1	1.0	1	.4
609 Department & mail order establishments			1	1.0	2	2.0	3	1.2
381 Stock clerks & storekeepers							5	2.0
207 Radio, T.V., & communication equipment					1	1.0	1	.4
608 Hardware & farm equipment stores	1	2.1					1	.4
609 Department & mail order establishments			1	1.0			1	.4
628 Grocery stores			2	2.0			2	.8
382 Teacher aides, except school monitors							1	.4
857 Elementary & secondary schools	1	2.1					1	.4
391 Typists							1	.4
339 Printing, publishing, & allied industries, except newspaper			1	1.0			1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
394 Misc. clerical workers							2	.8
448 Telephone (wire & radio)			1	1.0			1	.4
609 Department & mail order establishments			1	1.0			1	.4
395 Not specified clerical workers							3	1.2
268 Meat products			1	1.0			1	.4
379 Rubber products			1	1.0			1	.4
407 Railroad & railways express services	1	2.1					1	.4
415 Carpenters							1	.4
067 General building contractors			1	1.0			1	.4
425 Decorators & window dressers							1	.4
609 Department & mail order establishments					1	1.0	1	.4
441 Foremen, n.e.c.							4	1.6
067 General building contractors			1	1.0			1	.4
588 Not specified wholesale trade					1	1.0	1	.4
609 Department & mail order establishments					1	1.0	1	.4
728 Services to dwellings & other buildings			1	1.0			1	.4
473 Automobile mechanics							1	.4
757 Automobile repair & related services	1	2.1					1	.4
485 Radio & television							1	.4
668 Household appliances, T.V., and radio stores			1	1.0			1	.4
492 Misc. mechanic & repairmen							1	.4
417 Trucking services			1	1.0			1	.4
510 Painters, construction and maintenance							1	.4
069 Department & mail order establishments					1	1.0	1	.4
602 Assemblers							3	1.2
178 Farm machinery & equipment					1	1.0	1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
238 Cycles & misc. transportation equipment			1	1.0			1	.4
269 Dairy products			1	1.0			1	.4
623 Garage workers & gas station attendants							4	1.6
648 Gasoline service station	1	2.1	1	1.0	2	2.0	4	1.6
643 Packers & wrappers, except meat and produce							2	.8
628 Grocery stores					2	2.0	2	.8
660 Riveters & fasteners							2	.8
398 Not specified manufacturing industries	1	2.1			1	1.0	2	.8
662 Sawyers							1	.4
108 Sawmills, planing mills, and mill works					1	1.0	1	.4
663 Sewers and stitchers							1	.4
398 Not specified manufacturing industries					1	1.0	1	.4
715 Truck drivers							5	2.0
417 Trucking services					2	2.0	2	.8
527 Food and related products			1	1.0			1	.4
637 Retail bakeries	1	2.1					1	.4
647 Tire, battery, & accessory dealers					1	1.0	1	.4
751 Construction laborers, except carpenters' helpers							3	1.2
067 General building contractors			2	2.0			2	.8
069 Special trade contractors			1	1.0			1	.1
755 Gardeners & groundkeepers, except farm							1	.4
809 Misc. entertainment & recreation services	1	2.1					1	.4
762 Stock handlers							8	3.2
609 Department & mail order establishments					1	1.0	1	.4
628 Grocery stores			1	1.0	4	3.9	5	2.0
668 Household appliance, T.V., and radio stores	1	2.1					1	.4

Occupation/Industry	YEAR OF GRADUATION							
	1969-70		1970-71		1971-72		TOTAL	
	No.	%	No.	%	No.	%	No.	%
697 Misc. retail stores					1	1.0	1	.4
770 Warehousemen, n.e.c.							1	.4
418 Warehousing & storage	1	2.1					1	.4
785 Not specified laborers							7	2.8
068 General contractors, except building			1	1.0			1	.4
069 Special trade contractors					1	1.0	1	.4
269 Dairy products	2	4.2					2	.8
329 Misc. paper & pulp products	1	2.1					1	.4
398 Not specified manufacturing industries					1	1.0	1	.4
857 Elementary and secondary schools	1	2.1					1	.4
821 Farm foremen							1	.4
897 Misc. professional and related services					1	1.0	1	.4
901 Chambermaids & maids, except private household							1	.4
777 Hotels & motels					1	1.0	1	.4
912 Cooks, except private household							2	.8
669 Eating & drinking places	1	2.1					1	.4
777 Hotels & motels	1	2.1					1	.4
921 Dental assistant							2	.8
829 Offices of dentists	1	2.1	1	1.0			2	.8
922 Health aides, except nursing							1	.4
677 Drug stores			1	1.0			1	.4
925 Nursing aides, orderlies and attendants							2	.8
838 Hospitals					1	1.0	1	.4
839 Convalescent institutions	1	2.1					1	.4
934 Baggage porters & bellhops							1	.4
777 Hotels & motels					1	1.0	1	.4
964 Policemen & detectives							1	.4
849 Legal services	1	2.1					1	.4
TOTAL	48	100.0	101	100.0	102	100.0	251	100.0

APPENDIX V

DETAILED GEOGRAPHIC LOCATION DIMENSION OF JOB SELECTION PATTERNS

TABLE 29

DETAILED GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE AGRI-TECHNOLOGY PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

	1969-70		1970-71		1971-72		TOTAL	
Economic Region	No.	%	No.	%	No.	%	No.	%
Region 1			1	1.9	1	2.2	2	1.7
Region 2								
Region 3								
Region 4	1	4.5	7	13.2	6	13.0	14	11.6
Region 5			2	3.8	1	2.2	3	2.5
Region 6	8	36.4	12	22.6	8	17.4	28	23.1
Region 7	2	9.1	3	5.7	1	2.2	6	4.9
Region 8			10	18.9	8	17.4	18	14.9
Region 9	1	4.5	4	7.5	5	10.9	10	8.3
Region 10	2	9.1	8	15.0	5	10.9	15	12.4
Region 11	2	9.1	3	5.7	4	8.7	9	7.4
North Dakota	2	9.1			2	4.3	4	3.3
South Dakota	1	4.5			2	4.3	3	2.5
Iowa			1	1.9			1	1.9
Wisconsin			1	1.9	2	4.3	3	2.5
Other States	3	13.7	1	1.9	1	2.2	5	4.1
TOTAL	22	100.0	53	100.0	46	100.0	121	100.0

TABLE 30

DETAILED GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE AUTOMOTIVE PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

	1969-70		1970-71		1971-72		TOTAL	
Economic Region	No.	%	No.	%	No.	%	No.	%
Region 1	1	1.2	3	3.2	5	4.8	9	3.2
Region 2	3	3.6	5	5.3	1	.9	9	3.2
Region 3	9	10.8	6	6.3	9	8.7	24	8.5
Region 4	7	8.4	5	5.3	7	6.8	19	6.8
Region 5	3	3.6	7	7.4	3	2.9	13	4.6
Region 6	9	10.9	3	3.2	3	2.9	15	5.3
Region 7	6	7.2	13	13.8	13	12.5	32	11.4
Region 8	3	3.6	3	3.2	11	10.6	17	6.1
Region 9	2	2.4	8	8.5	10	9.6	20	7.1
Region 10	10	12.1	13	13.9	14	13.5	37	13.2
Region 11	23	27.8	22	23.4	20	19.2	65	23.1
North Dakota	1	1.2	1	1.1	3	2.9	5	1.8
South Dakota	1	1.2	1	1.1	3	2.9	5	1.8
Iowa					1	.9	1	.4
Wisconsin	1	1.2	1	1.1			2	.7
Other States	4	4.8	3	3.2	1	.9	8	2.8
TOTAL	83	100.0	94	100.0	104	100.0	281	100.0

TABLE 31

DETAILED GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE CHEFS, COOKS, AND FOOD PREPARATION PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

	1969-70		1970-71		1971-72		TOTAL	
Economic Region	No.	%	No.	%	No.	%	No.	%
Region 1					1	1.2	1	.4
Region 2			1	1.5	1	1.2	2	.9
Region 3	11	14.1	6	8.8	8	9.9	25	11.0
Region 4	6	7.7	1	1.5	8	9.8	15	6.6
Region 5	4	5.1	3	4.4	4	4.9	11	4.8
Region 6	5	6.4	4	5.9	4	4.9	13	5.7
Region 7	3	3.8	3	4.4	2	2.5	8	3.5
Region 8	1	1.3	1	1.5	1	1.2	3	1.3
Region 9	10	12.8	4	5.9	2	2.5	16	7.1
Region 10	2	2.6	5	7.3	3	3.7	10	4.4
Region 11	29	37.2	36	52.9	26	32.2	91	40.2
North Dakota	2	2.6			10	12.4	12	5.3
South Dakota								
Iowa	2	2.6	1	1.5	1	1.2	4	1.8
Wisconsin					1	1.2	1	.4
Other States	3	3.8	3	4.4	9	11.1	15	6.6
TOTAL	78	100.0	68	100.0	81	100.0	227	100.0

TABLE 32

DETAILED GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE CLERICAL TRAINING PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

	1969-70		1970-71		1971-72		TOTAL	
Economic Region	No.	%	No.	%	No.	%	No.	%
Region 1	5	5.1	7	8.0	3	2.9	15	5.2
Region 2	1	1.0	4	4.6	1	1.0	6	2.1
Region 3	9	9.1	4	4.6	9	8.6	22	7.6
Region 4	3	3.0	4	4.6	4	3.8	11	3.8
Region 5	1	1.0	2	2.3	6	5.8	9	3.1
Region 6	8	8.1	6	6.9	11	10.6	25	8.6
Region 7	9	9.1	8	9.2	8	7.7	25	8.6
Region 8	3	3.0	4	4.6	9	8.6	16	5.5
Region 9	12	12.1	12	12.9	2	1.9	26	8.9
Region 10	4	4.0	10	11.4	10	9.6	24	8.2
Region 11	37	37.5	21	23.9	31	29.9	89	30.6
North Dakota	3	3.0	2	2.3	5	4.8	10	3.4
South Dakota	1	1.0			2	1.9	3	1.0
Iowa					2	1.9	2	.7
Wisconsin			1	1.2	1	1.0	2	.7
Other States	3	3.0	3	3.5			6	2.0
TOTAL	99	100.0	88	100.0	104	100.0	291	100.0

TABLE 33

DETAILED GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR
BY SAMPLE OF GRADUATES OF THE ELECTRONICS PROGRAM AREA
IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUES,
SCHOOL YEARS 1969-70 TO 1971-72

	1969-70		1970-71		1971-72		TOTAL	
Economic Region	No.	%	No.	%	No.	%	No.	%
Region 1	2	2.5	1	1.1	2	2.0	5	1.8
Region 2			2	2.2			2	.7
Region 3	6	7.4	8	8.9	7	6.9	21	7.7
Region 4	2	2.5	1	1.1	2	2.0	5	1.8
Region 5	1	1.2			2	2.0	3	1.1
Region 6	4	4.9			6	5.9	10	3.7
Region 7	6	7.4	5	5.6	3	2.9	14	5.1
Region 8			5	5.6	4	3.9	9	3.3
Region 9	10	12.4	10	11.1	14	13.7	34	12.4
Region 10	7	8.6	10	11.1	9	8.8	26	9.5
Region 11	38	46.9	38	42.2	42	41.0	118	43.4
North Dakota	2	2.5	8	8.9	2	2.0	12	4.4
South Dakota			1	1.1			1	.4
Iowa					2	2.0	2	.7
Wisconsin	1	1.2			2	2.0	3	1.1
Other States	2	2.5	1	1.1	5	4.9	8	2.9
TOTAL	81	100.0	90	100.0	102	100.0	273	100.0

TABLE 34

DETAILED GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE MACHINE SHOP PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

	1969-70		1970-71		1971-72		TOTAL	
Economic Region	No.	%	No.	%	No.	%	No.	%
Region 1	2	2.9					2	.8
Region 2			2	2.2			2	.8
Region 3	9	13.0	7	7.8	13	13.8	29	11.5
Region 4	6	8.7	3	3.3	4	4.3	13	5.1
Region 5	6	8.7	7	7.8	1	1.1	14	5.5
Region 6	3	4.4	4	4.4	4	4.3	11	4.4
Region 7	1	1.4	11	12.2	21	22.3	33	13.0
Region 8	1	1.4	1	1.1	1	1.1	3	1.2
Region 9	4	5.8	4	4.4	4	4.3	12	4.7
Region 10	3	4.4	5	5.6	5	5.3	13	5.1
Region 11	33	47.9	43	47.9	39	41.4	115	45.5
North Dakota								
South Dakota								
Iowa			2	2.2			2	.8
Wisconsin								
Other States	1	1.4	1	1.1	2	2.1	4	1.6
TOTAL	69	100.0	90	100.0	94	100.0	253	100.0

TABLE 35

DETAILED GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE PRACTICAL NURSING PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUTES, SCHOOL YEARS 1969-70 TO 1971-72

Economic Region	1969-70 No.	1969-70 %	1970-71 No.	1970-71 %	1971-72 No.	1971-72 %	TOTAL No.	TOTAL %
Region 1			1	.8	3	3.0	4	1.2
Region 2	2	1.6			3	3.0	5	1.4
Region 3	23	18.2	19	16.0	2	2.0	44	12.7
Region 4	1	.8	3	2.5	2	2.0	6	1.7
Region 5	3	2.4	7	5.9	2	2.0	12	3.5
Region 6	6	4.8	4	3.4	2	2.0	12	3.5
Region 7	14	11.1	10	8.4	12	11.8	36	10.4
Region 8	2	1.6			4	4.0	6	1.7
Region 9	9	7.1	9	7.6	7	6.9	25	7.2
Region 10	12	9.5	11	9.2	28	27.7	51	14.7
Region 11	46	36.5	45	37.8	31	30.6	122	35.3
North Dakota			1	.8	3	3.0	4	1.2
South Dakota	1	.8					1	.3
Iowa								
Wisconsin	3	2.4	2	1.7	2	2.0	7	2.0
Other States	4	3.2	7	5.9			11	3.2
TOTAL	126	100.0	119	100.0	101	100.0	346	100.0

TABLE 36

DETAILED GEOGRAPHIC LOCATION OF JOBS HELD AFTER ONE YEAR BY SAMPLE OF GRADUATES OF THE SALES AND BUSINESS MANAGEMENT PROGRAM AREA IN MINNESOTA AREA VOCATIONAL TECHNICAL INSTITUES, SCHOOL YEARS 1969-70 TO 1971-72

	1969-70		1970-71		1971-72		TOTAL	
Economic Region	No.	%	No.	%	No.	%	No.	%
Region 1					1	1.0	1	.4
Region 2			2	2.0			2	.8
Region 3	7	14.6	11	10.9	10	9.8	28	11.2
Region 4	4	8.3	13	12.9	6	5.9	23	9.2
Region 5			1	1.0	1	1.0	2	.8
Region 6			10	9.9	9	8.8	19	7.6
Region 7	7	14.6	8	7.9	10	9.8	25	10.0
Region 8	1	2.1	3	3.0	5	4.9	9	3.6
Region 9	4	8.3	6	5.9	9	8.8	19	7.6
Region 10	12	25.0	7	6.9	11	10.7	30	12.0
Region 11	9	18.7	28	27.7	24	23.5	61	24.3
North Dakota	2	4.2	3	3.0	7	6.9	12	4.7
South Dakota			1	1.0	2	2.0	3	1.2
Iowa					1	1.0	1	.4
Wisconsin	1	2.1	2	2.0	1	1.0	4	1.5
Other States	1	2.1	6	5.9	5	4.9	12	4.7
TOTAL	48	100.0	101	100.0	102	100.0	251	100.0

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*Single copies of these publications are available, free of charge, from the Minnesota Research Coordinating Unit for Vocational Education. The other publications listed are available in either hardcopy or microfiche form from Central ERIC.